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# *EPSON® User's Guide Update*

In order to take advantage of the latest technology, the system board in your computer has been completely redesigned.

This update includes last-minute information that was not available at the time your on-screen User's Guide was created.

## *External Cache*

Your computer supports up to 1MB of external cache. If your system already has cache installed, it can be increased up to 1MB. However, you cannot install cache chips yourself. Please contact your Authorized EPSON Servicer if you want to install cache memory in your computer.

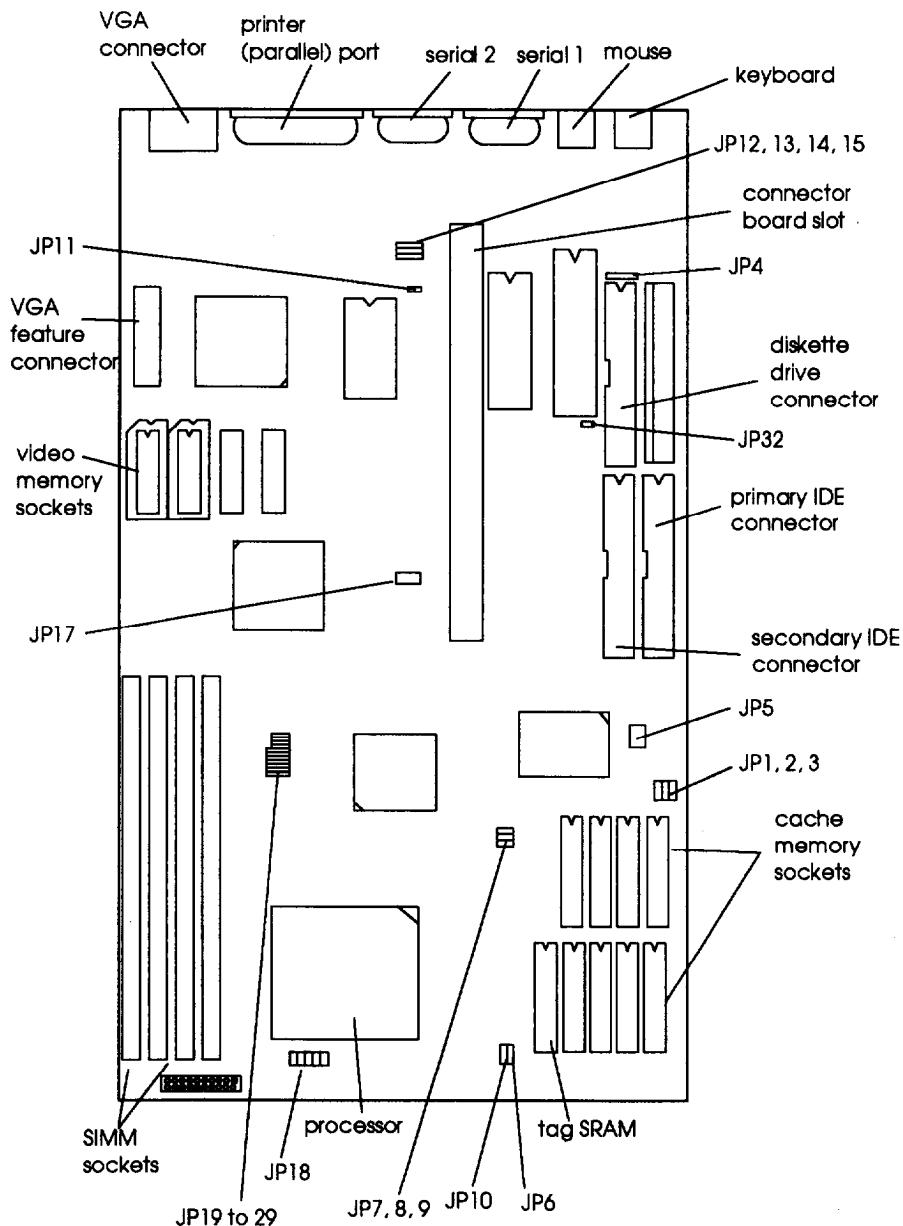
## *Power Management*

The Windows® 95 CD-ROM Autoplay feature operates continuously and prevents power management from being fully effective on your system. If you want to take advantage of your computer's power-saving features, you must use the Widows Device Manager to disable Autoplay. See your Windows documentation for instructions.

## *System Board*

Because your computer's system board has been redesigned, the illustrations showing the board in Chapter 4 of your User's Guide are incorrect. Board components such as jumpers and SIMM sockets have been relocated. However, disk drives and other internal components are shown correctly in the illustrations.

The illustration below shows the correct location of jumpers and other components on the system board in your computer.



## *Jumper Settings*

The jumpers on the system board have been renumbered, as shown in the tables below. The factory default settings are indicated by an asterisk (\*).

### *Miscellaneous jumper settings*

<b>Jumper number</b>	<b>Jumper setting</b>	<b>Function</b>
JP4	1-2* 2-3 Off	Selects 5V flash ROM Selects 12V flash ROM EPROM
JP5	Off* 1-2	Enables PCI IDE controller Disables PCI IDE controller
JP11	On Off*	Clears CMOS memory (resets SETUP values to factory defaults) Normal CMOS values
JP12	1-2 * 2-3	Enables on-board I/O controller Disables on-board I/O controller
JP15	1-2 * 2-3	Enables on-board VGA controller Disables on-board VGA controller

### *Parallel port ECP mode DRQ jumper settings*

<b>Function</b>	<b>JP13</b>	<b>JP14</b>
DRQ1 (DACK1)	1-2	1-2
DRQ4 (DACK3)	2-3	2-3

### *CPU voltage jumper settings*

<b>CPU voltage</b>	<b>JP18</b>
3.3V	13-4
3.45V	5 - 6
3.6V	7-8
4.0V	19-10
5.0V	1-2

### *Cache jumper settings*

<b>Cache configuration</b>	<b>JP1</b>	<b>JP2</b>	<b>JP3</b>	<b>JP7</b>	<b>JP8</b>	<b>JP9</b>
128KB (32K x 8 SRAMs in Bank 0)	2-3	Off	Off	Off	Off	Off
256KB (32K x 8 SRAMs in Banks 0 & 1)	1-2	Off	Off	Off	Off	On
256KB (64K x 8 SRAMs in Bank 0 )	2-3	1-2	Off	Off	Off	On
512KB (64K x 8 SRAMs in Banks 0 & 1)	1-2	2-3	Off	On	Off	On
512KB (128K x 8 SRAMs in Bank 0)	2-3	1-2	1-2	On	Off	On
1MB (128K x 8 SRAMs in Banks 0 & 1)	1-2	2-3	2-3	On	On	On

*CPU type jumpers settings*

Jumper number	CPU type										
	Intel or AMD		Intel			Cyrix			UMC		
	486 DX/DX2 (non-SL)	486 DX2/DX4 (P24D L1-WB or SV6B)	486 SX	486 DXSL/DX2SL/DXASL (non-WB)	486 SXSL/SX2SL	P2AT	5326 (M1SC)	486 S (M4)	486 DX/DX2/DX4 (M7)	U5DS-SUPER	U5S SUPER
JP6	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3
JP10	1-2	1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3	1-2	1-2
JP19	Off	Off	Off	Off	Off	Off	Off	On	On	Off	Off
JP20	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
JP21	Off	Off	Off	*	Off	Off	Off	Off	Off	Off	Off
JP22	1-2	2-3	1-2	2-3	2-3	2-3	2-3	2-3	2-3	1-2	1-2
JP23	1-2	1-2	Off	1-2	Off	2-3	1-2	Off	1-2	1-2, 3-4	1-2, 3-4
JP24	Off	3-4	Off	Off	Off	Off	1-2, 3-4	2-3	2-3	Off	Off
JP25	Off	1-2	Off	1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3
JP26	Off	1-2, 3-4	Off	1-2	1-2	1-2	1-2, 3-4	2-3	2-3	Off	Off
JP27	Off	Off	Off	Off	Off	1-2	Off	1-2	2-3	3-4	3-4
JP28	1-2, 3-4	1-2, 3-4	2-3	1-2, 3-4	2-3	1-2, 3-4	1-2, 3-4	2-3	1-2, 3-4	1-2, 3-4	2-3
JP29	Off	2-3, 4-5	Off	2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-6	1-2, 3-4	Off	Off
JP32	On	Off	On	Off	Off	Off	Off	On	Off	On	On

CPU clock speed	JP17	I
25 Mhz	1-2	
33 MHz	1-2,3-4,5-6	
40 MHz	1-2,3-4	
50 Mhz	5-6	

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# EPSON®

## User's Guide



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*The Energy Star emblem does not represent EPA endorsement of any product or service.*

# Important Safety Instructions

Read all of these instructions and save them for later reference. Follow all warnings and instructions marked on the computer.

- Unplug the computer before cleaning. Clean with a damp cloth only. Do not spill liquid on the computer.
- Do not place the computer on an unstable surface or near a radiator or heat register.
- Do not block or cover the openings in the computer's cabinet. Do not insert objects through the slots.
- Use only the type of power source indicated on the computer's label.
- Connect all equipment to properly grounded power outlets. Avoid using outlets on the same circuit as photocopiers or air control systems that regularly switch on and off.
- Do not let the computer's power cord become damaged or frayed.
- If you use an extension cord with the computer, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating. Also, make sure the total of all devices plugged into the wall outlet does not exceed 15 amperes.
- Except as specifically explained in this *Users Guide*, do not attempt to service the computer yourself.
- Unplug the computer and refer servicing to qualified service personnel under the following conditions:

If the power cord or plug is damaged; if liquid has entered the computer; if the computer has been dropped or the cabinet damaged; if the computer does not operate normally or exhibits a distinct change in performance. Adjust only those controls that are covered by the operating instructions.

- If you plan to use the computer in Germany, observe the following:

To provide adequate short-circuit protection and over-current protection for this computer, the building installation must be protected by a 16 Amp circuit breaker.

# Importantes instructions de sécurité

Lire attentivement les instructions suivantes et les conserver pour les consulter en cas de besoin. Observer soigneusement tous les avertissements et directives marqués sur l'ordinateur.

- Débrancher l'ordinateur avant de le nettoyer. N'utiliser qu'un chiffon humide. Veiller à ne pas renverser de liquides sur l'appareil.
- Ne pas placer l'ordinateur sur une surface instable ni près d'une source de chaleur.
- Ne pas bloquer ni couvrir les orifices d'aération de l'appareil. Ne pas introduire d'objets dans les ouvertures.
- Utiliser seulement le type de source d'alimentation électrique indiqué sur l'étiquette.
- Tout l'équipement doit être branché sur des prises de courant avec contact de terre. Ne jamais utiliser une prise sur le même circuit qu'un appareil à photocopies ou un système de contrôle de ventilation avec commutation marche-arrêt automatique.
- S'assurer que le cordon d'alimentation de l'ordinateur n'est pas abîmé ni effiloché.
- Dans le cas où on utilise un cordon de rallonge avec l'ordinateur, s'assurer que l'intensité en ampères requise pour tous les appareils branchés sur ce cordon ne soit pas supérieure à la capacité du cordon. S'assurer aussi que cette intensité ne dépasse jamais la somme de 15 ampères pour l'ensemble des appareils.
- Sauf dans les cas spécifiques expliqués dans ce manuel de l'usager, ne pas essayer d'entretenir ou de réparer l'ordinateur soi-même.
- Débrancher l'ordinateur et contacter un technicien qualifié dans les circonstances suivantes:
  - Si le cordon ou la prise sont abîmés; si un liquide a pénétré à l'intérieur de l'appareil; si on a laissé tomber l'appareil ou si le boîtier est endommagé; si l'ordinateur ne fonctionne pas normalement ou fonctionne d'une manière très différente de l'ordinaire. N'ajuster que les commandes décrites dans les directives.
  - Pour utiliser l'ordinateur en Allemagne, il est nécessaire que le bâtiment soit muni d'un disjoncteur de 16 ampères pour protéger l'ordinateur contre les courts-circuits et le survoltage.

# Wichtige Sicherheitshinweise

Bitte lesen Sie diese Sicherheitshinweise, und heben Sie sie zur späteren Verwendung auf. Beachten Sie alle Warnungen und Anweisungen, die auf dem Computer angebracht sind.

- Ziehen Sie das Netzkabel des Computers vor der Reinigung heraus. Verwenden Sie zur Reinigung nur ein feuchtes Tuch. Achten Sie darauf, daß keine Flüssigkeiten auf dem Computer verschüttet werden.
- Stellen Sie den Computer nur auf einer stabilen Arbeitsfläche auf, und halten Sie ihn von Heizkörpern und Warmluftquellen fern.
- Achten Sie darauf, daß die Öffnungen im Computergehäuse nicht blockiert oder verdeckt werden. Führen Sie keine Fremdkörper in die Lüftungsschlitzte ein.
- Verwenden Sie nur die auf dem Typenschild des Computers angegebene Stromversorgung.
- Schließen Sie alle Geräte an ordnungsgemäß geerdete Steckdosen an. Verwenden Sie keine Steckdosen, die mit demselben Stromkreis wie Fotokopiergeräte oder Klimaanlagen, die sich regelmäßig ein- und ausschalten, verbunden sind.
- Achten Sie darauf, daß das Netzkabel des Computers stets in einwandfreiem Zustand ist.
- Stellen Sie bei Verwendung eines Verlängerungskabels sicher, daß der gesamte Amperewert aller an das Verlängerungskabel angeschlossenen Geräte den zulässigen Höchstwert des Kabels nicht überschreitet. Stellen Sie ferner sicher, daß der Gesamtwert aller an die Wandsteckdose angeschlossenen Geräte 15 Ampere nicht überschreitet.
- Führen Sie keine Wartungsarbeiten am Computer durch, die über das im *Benutzerhandbuch* beschriebene Ausmaß hinausgehen.

- Ziehen Sie den Computer heraus, und rufen Sie qualifiziertes Wartungspersonal, wenn eine der folgenden Bedingungen auftritt:  
Das Netzkabel oder der Netzstecker ist beschädigt; Flüssigkeit ist in den Computer eingetreten; der Computer wurde fallengelassen oder das Gehäuse ist beschädigt; der Computer funktioniert nicht ordnungsgemäß oder die Leistung hat sich merklich geändert. Stellen Sie nur die Bedienelemente ein, die in der Gebrauchsanweisung beschrieben sind.
- Nehmen Sie den Computer bei Flugreisen als Handgepäck mit in den Fluggastraum, damit er nicht in einem drucklosen Frachtraum verstaut wird.
- Beachten Sie den folgenden Hinweis, wenn Sie den Computer in Deutschland in Betrieb nehmen:  
Beim Anschluß des Computers an die Netzversorgung muß sichergestellt werden, daß die Gebäudeinstallation mit einem 16 A Überstromschutzschalter abgesichert ist.

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## *Introduction*

Your new EPSON® computer is a full powered, full featured system that gives you complete access for all your business or home computer needs. And because your computer is plug and play compliant and designed to take advantage of Microsoft® Windows® 95, you'll be able to use all the latest technology.

With the computer's high-performance processor and memory you can run a vast array of the latest programs, utilities, and games designed for productivity and fun.

Your system's state-of-the art PCI (Peripheral Component Interconnect) bus architecture gives you fast and efficient access to both PCI and IDE option cards. It also provides PCI performance for IDE drives and your VGA or high-resolution monitor.

And when you're ready for even more capability, you can expand your system, video, and cache memory, install option cards or additional drives, and upgrade your processor.

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## *Computer Features*

Your computer offers the following features:

- Upgradable 486-class processor
- 4 or 8MB of RAM (Random Access Memory), expandable to 128MB
- PCI-based main system board providing PCI caching, memory, bus control, video control, and IDE (Integrated Drive Electronics) device control

- High-speed, PC1 video controller with 64-bit DRAM video interface and 32-bit CPU interface
- Two PCI ATA-2 compatible, enhanced IDE interfaces supporting up to four IDE devices, such as hard disk drives and CD-ROM drives (two on each interface)
- 8 or 16KB of internal cache in the processor and up to 512KB of external cache on the main system board
- 1MB of on board video memory for resolutions up to 1024 x 768; memory expandable to 2MB
- Three Energy Star compliant power-saving modes for the CPU, video, and hard disk drives in standard configurations
- Three 16-bit, ISA (Industry Standard Architecture) option slots and two PCI option slots supporting up to two PCI bus master cards
- On the slim line model, space for up to four mass storage devices, three externally accessible and one internal; on the tower model, space for up to seven mass storage devices, four externally accessible and three internal.

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## *Power-saving Features*

In standard configurations, this computer complies with the United States Environmental Protection Agency's Energy Star Program, which promotes the manufacture of energy-efficient printers, computers, and monitors. Your computer's "Green PC" features place the CPU, video, and hard disk drives in power-saving modes when the mouse and keyboard have been inactive for a specified period of time. You can customize the Green PC features in the SETUP program.

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## *ISA and PCI Expansion Buses*

Your computer includes expansion buses for two types of option cards: ISA and PCI. The PCI bus provides extremely fast data transfer (33 MHz) for up to two high-performance PCI cards, such as high-speed video cards. PCI cards use plug and play technology that automatically configures resources used by the card, such as interrupt requests and memory addresses.

The ISA bus transfers data at 8.33 MHz for up to three 16-bit ISA option cards. You can use these slots for standard ISA cards such as fax/modem cards, sound cards, and SCSI (Small Computer System Interface) cards.

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## *System and video BIOS*

The computer's system and video BIOS are contained in a flash memory device on the main system board, which you can upgrade without replacing the chip.

Your computer supports shadowing of the system and video BIOS to allow BIOS routines to run from fast, 32-bit RAM instead of from the slower, 8-bit flash device.

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## *How to Use This Manual*

This manual contains the information you need to get the best results from your computer. You don't have to read everything; see the following chapter summaries to find the sections you need.

If you are reading the manual online, click on the highlighted words below to skip to the section you want to read.

**Chapter 1** provides instructions for setting up your system and connecting peripheral devices such as the monitor and printer.

**Chapter 2** describes how to run the SETUP program to change your computer's configuration and how to install the PCI IDE and video drivers.

**Chapter 3** covers general operating procedures, such as using your Green PC features and using a password.

**Chapter 4** describes how to remove and replace the computer's cover, change jumper settings, and install optional equipment such as option cards, memory modules, and video memory.

**Chapter 5** explains how to install and remove mass storage devices on the slim line computer.

**Chapter 6** explains how to install and remove mass storage devices on the tower computer.

**Chapter 7** contains troubleshooting tips.

**Appendix A** lists the specifications of your computer, including DMA and IRQ assignments.

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## *Where to Get Help*

If you purchased your computer in the United States or Canada, EPSON provides customer support and service through a network of Authorized EPSON Customer Care Centers. EPSON also provides the following services when you dial (800) **9224911**:

- Technical assistance with the installation, configuration, and operation of EPSON products
- Assistance in locating your nearest Authorized EPSON Reseller or Customer Care Center

- Customer relations
- EPSON technical information library fax service
- Product literature on current and new products.

You can purchase printed manuals, accessories, or parts for EPSON products from EPSON Accessories at (800) 873-7766 (U.S. sales only). In Canada, call **(800) BUY-EPSON**.

If you purchased your computer outside the United States or Canada, contact your EPSON dealer or the marketing location nearest you for customer support and service.

If you need help with any software program you are using, see the documentation for that program for technical support information. If the software was installed on your computer, see the *User's Digest* for technical support information.

## *Electronic Support Services*

If you have a modem, the fastest way to access helpful tips, specifications, drivers, application notes, DIP switch or jumper settings, and bulletins for EPSON products is through the online services below.

### *EPSON Bulletin Board Service*

You can call the EPSON Bulletin Board Service (BBS) at (310) 782-4531. No membership is required. Make sure your communications software is set to 8 data bits with 1 stop bit, no parity bit, and a modem speed up to 28.8 Kbps. See the documentation that came with your communications software for more information.

## *CompuServe online support*

CompuServe® members can call the Epson America Forum on CompuServe. If you are already a member, simply type GO EPSON at the menu prompt to reach the Forum.

If you are not currently a member, you are eligible for a free introductory membership as an owner of an EPSON product. This membership entitles you to:

- An introductory credit on CompuServe
- Your own user ID and password
- A complimentary subscription to *CompuServe Magazine*, CompuServe's monthly publication.

To take advantage of this offer, call (800) 848-8199 in the United States and Canada and ask for representative #529. In other countries, call the following U.S. telephone number:

**(614) 529-1611**, or your local CompuServe access number.

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# **Contents**

---

## ***Introduction***

Computer Features . . . . .	1
Power-saving Features . . . . .	2
ISA and PCI Expansion Buses . . . . .	3
System and Video BIOS . . . . .	3
How to Use This Manual . . . . .	3
Where to Get Help . . . . .	4
Electronic Support Services . . . . .	5

---

## ***Chapter 1     Setting Up Your System***

Choosing a Location . . . . .	1-1
Setting the Voltage Selector Switch . . . . .	1-2
Connecting System Components . . . . .	1-3
Connecting a Keyboard or Mouse . . . . .	1-4
Connecting a Monitor . . . . .	1-4
Connecting a Parallel or Serial Device . . . . .	1-6
Connecting the Power Cord . . . . .	1-7
Turning On the Computer . . . . .	1-8
Turning Off the Computer . . . . .	1-10

---

## ***Chapter 2     Running SETUP and Installing Drivers***

Starting the SETUP Program . . . . .	2-2
Using the System Setup Option . . . . .	2-3
Using the Fixed Disk Setup Option . . . . .	2-5
Using the Advanced System Setup Options . . . . .	2-7
Setting the Boot Options . . . . .	2-12
Selecting the Security and Anti-Virus Options . . . . .	2-13
Using the Green PC Features . . . . .	2-16
Exiting SETUP . . . . .	2-18
Installing the PCI IDE Drivers . . . . .	2-18
Running the Installation Program . . . . .	2-20
Installing Video Drivers . . . . .	2-21

---

## **Chapter 3     Using Your Computer**

---

Working Comfortably . . . . .	3-1
Using the Right Furniture . . . . .	3-2
Positioning Your Monitor . . . . .	3-3
Lighting Your Workspace . . . . .	3-4
Using the Keyboard and Mouse . . . . .	3-4
Maintaining Good Posture and Work Habits . . . . .	3-5
Backing Up Your Files . . . . .	3-6
Using Energy Wisely . . . . .	3-6
Using Your Green PC Features . . . . .	3-7
Inserting and Removing Diskettes . . . . .	3-8
Stopping a Command or Program . . . . .	3-9
Resetting the Computer . . . . .	3-10
Using a Password . . . . .	3-11

---

## **Chapter 4     Installing and Removing Options**

---

Removing the Cover . . . . .	4-2
Replacing the Cover . . . . .	4-5
Locating the Internal Components . . . . .	4-6
Locating System Board Components . . . . .	4-8
Changing the Jumper Settings . . . . .	4-9
Setting the Jumpers . . . . .	4-12
Installing Memory Modules (SIMMs) . . . . .	4-13
Inserting SIMMs . . . . .	4-17
Removing SIMMs . . . . .	4-19
Installing an Option Card . . . . .	4-20
Installing a Card in the Slim line Computer (3-slot Side) . . . . .	4-22
Installing a Card in the Slim line Computer (2-slot Side) . . . . .	4-23
Installing a Card in the Tower Computer . . . . .	4-25
Removing an Option Card . . . . .	4-27
Adding Video Memory . . . . .	4-27
Installing External Cache . . . . .	4-29
Upgrading the Processor . . . . .	4-32
Post-installation Procedures . . . . .	4-35

---

## ***Chapter 5 Ins falling and Removing Slim line Drives***

---

Removing the Drive Mounting Bracket . . . . .	5-2
Installing a Hard Disk Drive in the Mounting Bracket . . . . .	5-4
Setting the IDE Device Jumpers . . . . .	5-5
Installing the Hard Disk Drive . . . . .	5-6
Replacing the Bracket in the Computer . . . . .	5-7
Connecting the Drive Cables . . . . .	5-8
Reconnecting the Cables to the Diskette Drive . . . . .	5-12
Removing a Hard Disk Drive From the Mounting Bracket . . . . .	5-13
Installing a Drive in an External Drive Bay . . . . .	5-15
Attaching Mounting Frames to the Drive . . . . .	5-16
Installing the Drive . . . . .	5-17
Connecting the Drive and Power Cables . . . . .	5-19
Removing a Drive from an External Bay . . . . .	5-22

---

## ***Chapter 6 Installing and Removing Tower Drives***

---

Setting the Jumpers and Locating Pin 1 . . . . .	6-3
Installing a Drive in the Front Internal Drive Bay . . . . .	6-4
Installing the Internal Drive . . . . .	6-5
Connecting the Cables to the Front Internal Drive . . . . .	6-6
Removing a Drive From the Front Internal Drive Bay . . . . .	6-8
Installing a Drive in an External Bay . . . . .	6-11
Removing a Drive From an External Bay . . . . .	6-15
Installing a Drive in the Rear Internal Bracket . . . . .	6-17
Removing a Drive From the Rear Internal Bracket . . . . .	6-20

---

## ***Chapter 7 Troubleshooting***

---

Identifying Your System . . . . .	7-2
The Computer Will Not Start . . . . .	7-4
The Computer Does Not Respond . . . . .	7-5
Keyboard Problems . . . . .	7-6
Mouse Problems . . . . .	7-6
Monitor Problems . . . . .	7-7
Diskette Problems . . . . .	7-8
Diskette Drive Problems . . . . .	7-9
Hard Disk Drive Problems . . . . .	7-10

CD-ROM Drive Problems . . . . .	7-12
Password Problems . . . . .	7-12
Software Problems . . . . .	7-13
Printer or Scanner Problems . . . . .	7-14
Option Card Problems . . . . .	7-15
Memory Module Problems . . . . .	7-16
Controller Problems . . . . .	7-17
External Cache Problems . . . . .	7-17

---

## ***Appendix A Specifications***

---

CPU and Memory . . . . .	A - 2
Controllers . . . . .	A - 3
Interfaces . . . . .	A - 4
Mass Storage . . . . .	A - 5
Keyboard . . . . .	A - 6
Mouse . . . . .	A - 6
SETUP Program . . . . .	A - 6
Power Supply . . . . .	A - 6
Option Slot Power Limits . . . . .	A - 7
Physical Characteristics . . . . .	A - 7
Environmental Requirements . . . . .	A - 7
Video Resolutions and Colors . . . . .	A - 8
Processor Upgrades . . . . .	A - 9
Information for Qualified Hard Disk Drives . . . . .	A - 10
DMA Assignments . . . . .	A - 11
Hardware Interrupts . . . . .	A - 12
System Memory Map . . . . .	A - 12
System I/O Address Map . . . . .	A - 13
Connector Pin Assignments . . . . .	A - 14
Tested Operating Environments . . . . .	A - 15
Options Available From EPSON . . . . .	A - 16

---

## ***Glossary***

---

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## ***Index***

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## *Chapter- 1*

# ***Setting Up Your System***

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This chapter briefly describes how to set up your computer if you didn't set it up already using the information in your *User's Digest*. It includes the following information:

- Choosing a location
- Setting the voltage selector switch
- Connecting system components
- Turning the computer on and off.

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## ***Choosing a Location***

Before you set up your system, choose a convenient location that provides a flat, hard surface. Do not place your system too close to any electrical device, such as a radio, that generates an electromagnetic field. Protect your computer from extremes in temperature, humidity, dust, and smoke, and avoid direct sunlight or other sources of heat.

Read the “Important Safety Instructions” at the front of this manual for more information about choosing a suitable environment for your system.

Also read “Working Comfortably” in Chapter 3 for guidelines on creating a comfortable and safe working environment.

## **Setting the Voltage Selector Switch**

Your system is powered by a 200 Watt power supply. The power supply input voltage is controlled by a switch on the computer's back panel that may be set to 110 VAC or 220 VAC. (The switch on your computer may read 115 VAC or 230 VAC; these are equivalent settings.)

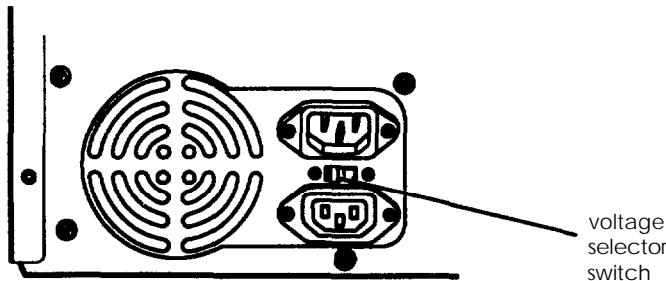
The computer is shipped with the voltage selector switch set to 110 VAC, which is appropriate for line source voltages between 100 and 120 VAC. This is generally the correct setting if you use the computer in North America, South America, or Japan.

If you plan to operate the computer in the United Kingdom, Europe, or some South American countries, you will almost certainly need to reset the voltage selector switch to 220 VAC. Line source voltages between 200 and 240 VAC are acceptable with the switch set to 220 VAC.

### **Caution**

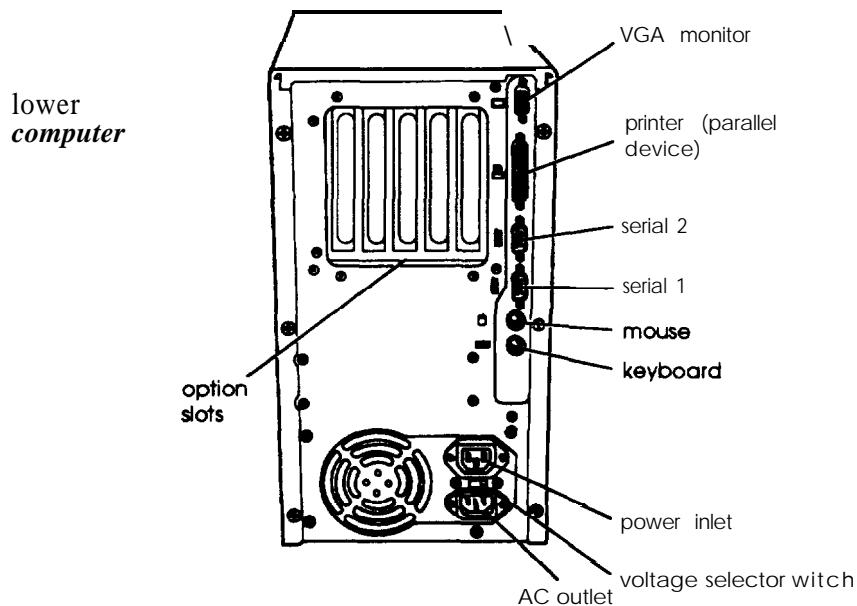
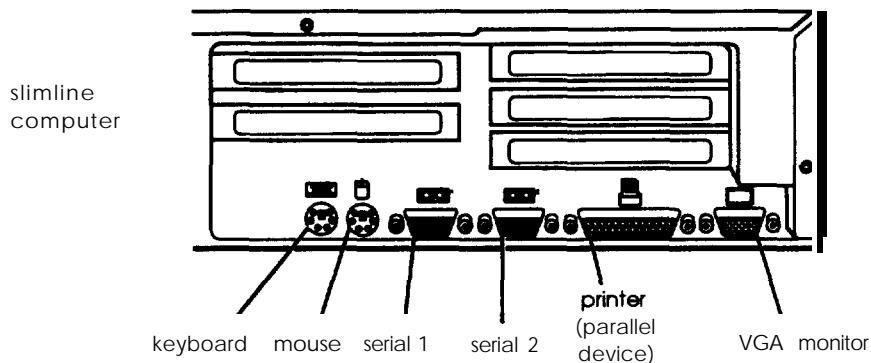
**Before you turn on the power to your system, make sure the voltage selector is set appropriately for the electrical power source in your location or you will seriously damage your system.**

To change the voltage selector switch setting, slide the switch to the left to select 110 VAC or to the right to select 220 VAC.



## ***Connecting System Components***

Use the illustrations below to locate the ports on the back of your system as you connect the keyboard, monitor, printer, and other devices. The icons on the case identify the function of each port.



## ***Connecting a Keyboard or Mouse***

Refer to the illustrations under “Connecting System Components” as you connect your keyboard and mouse.

-  To connect the keyboard, hold the cable connector so the arrow on the connector faces the icon on the computer case. Insert it into the keyboard port, marked with the icon shown at the left.

-  To connect the mouse, insert the connector into the computer’s built-in mouse port so the arrow or mark on the connector faces the icon on the computer case. The icon is shown at the left.

### **Caution**

Although the connectors and ports for the mouse and keyboard are physically identical, they cannot be used interchangeably. Be sure to plug the connectors into the appropriate ports, or you may damage your system.

## ***Connecting a Monitor***

Refer to the illustrations under “Connecting System Components” as you connect your VGA or SVGA monitor to the computer’s built-in monitor port.

Follow these steps to connect your monitor:

1. Place your monitor near the computer. Turn the monitor and computer around so the backs are facing you.

2. There should be two cables provided with your monitor: the monitor cable (to connect it to the computer) and the power cable (to connect it to a power source). On most monitors, the monitor cable is permanently attached to the monitor. If your monitor does not have an attached cable, connect the cable to it now.
3. Examine the connector on the monitor cable and line it up with the monitor port on the computer. Then insert the connector into the port.



This icon identifies the SVGA monitor port.

**Caution**

To avoid damaging the connector, be careful not to bend the pins when you insert it.

4. If the connector has retaining screws, tighten them.
5. Plug the monitor's power cord into the power inlet on the back of the monitor.
6. Plug the other end of the power cord into a grounded electrical outlet or into the power outlet on the back of the computer. Note that the position of the power inlet and AC outlet on your computer may be reversed.

**Caution**

Before you plug the monitor's power cord into the back of your computer, make sure the monitor's power requirements do not exceed 2 Amps at 115 volts and 1 Amp at 220 volts.

## **Connecting a Parallel or Serial Device**

Your computer has one multi-mode parallel (printer) port and two serial ports. To connect a printer or other peripheral device, refer to the illustrations under “Connecting System Components” as you follow the appropriate instructions in this section.

### *Using the parallel (printer) port*

Follow these steps to connect a parallel device to your computer:

1. Place the parallel device and the computer so that the backs are facing you.
2. Align the connector end of the parallel cable with the printer port and plug it in. If the connector has retaining screws, tighten them.



This icon identifies the printer port.

3. Connect the other end of the cable to the parallel device. To secure the cable, squeeze the clips at each side of the device port and push them into place.
4. Plug the parallel device’s power cord into a grounded electrical outlet.

If you want to take advantage of the port’s extended capabilities, see “Using the Advanced System Setup Options” in Chapter 2.

### Note

If you use ECP mode (Extended Capabilities Port), check your parallel device software documentation for the correct DMA channel (DRQ) setting. Then set jumpers JP8 and JP18 to match this setting if necessary. See “Changing the Jumper Settings” in Chapter 4 for more information.

## Using the serial ports

If you have a printer, a modem, or other device with a serial interface, you can connect it to one of the serial (RS-232C) ports. Make sure you have a cable compatible with a DB-9P connector.



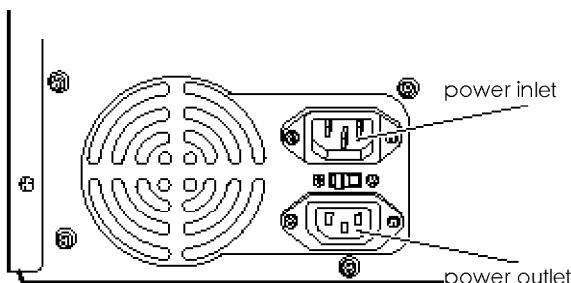
To connect a serial device, insert the connector into either of the two serial ports, which are marked with the icons shown at the left. If you are connecting only one serial device, use the serial 1 port.



## Connecting the Power Cord

Follow these steps to connect the computer's power cord:

1. Plug the power cord into the power inlet on the back of the computer. Note that the position of the power inlet and AC outlet on your computer may be reversed.



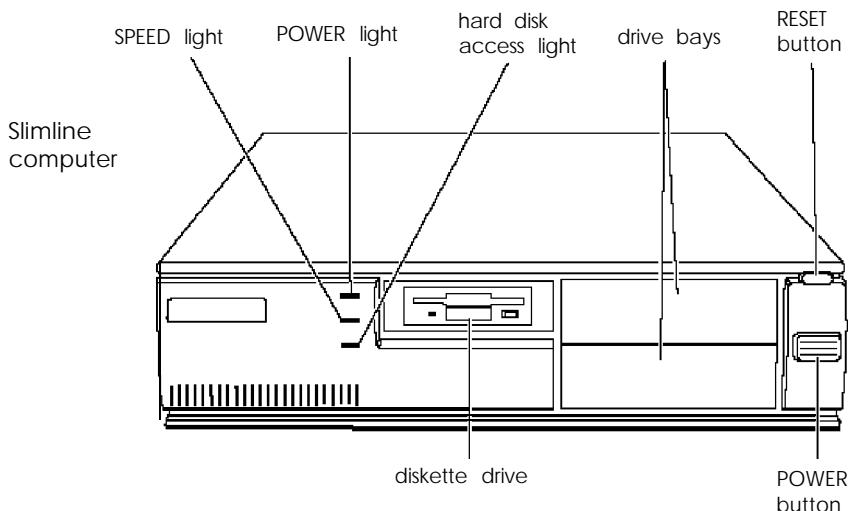
### **WARNING**

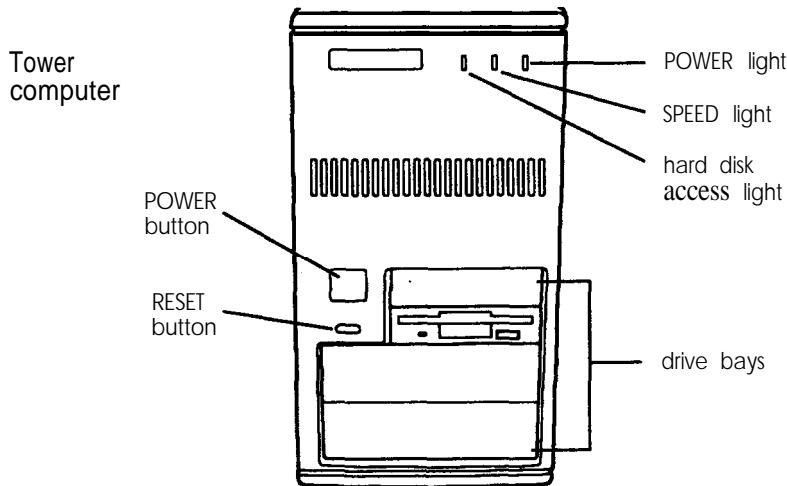
To avoid an electric shock, be sure to plug the cord into the computer before plugging it into the wall outlet.

2. Plug the other end of the cord into an electrical outlet.

## ***Turning On the Computer***

Once you set up your system, you're ready to turn on the power. Refer to the illustrations below to locate the POWER button and other features on the front panel.





**Caution**

Before you turn on your system, be sure to read “Important Safety Instructions” at the front of this manual to ensure that you have created a safe working environment.

Follow these steps to turn on your system:

1. Turn on the monitor, printer, and any other devices connected to the computer.
2. Turn on the computer by pressing the POWER button on the front panel.

The power indicator lights up; then the computer performs its power-on diagnostics, which are a series of checks to make sure everything is working correctly. During diagnostics, you see a message telling you to press Del to run the SETUP program.

You may want to run SETUP to adjust power saving features or establish passwords. See Chapter 2 for instructions. If you don't press Del, your computer loads the operating system.

## ***Turning Off the Computer***

Whenever you turn off your system, follow these steps:

1. Save your data, exit any application programs, and exit or shut down Windows. If you see a message, wait until it says you can safely turn off your computer.
2. Check the drive lights to make sure they are not on. You can damage the drive or lose data if you turn off the computer when one of these lights is on.
3. Remove any diskette(s) from the diskette drive(s).
4. Press the POWER button to turn off the computer
5. Turn off the monitor, printer, and any other peripheral devices.

## *Chapter 2*

# ***Running SETUP and Installing Drivers***

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If you've added options or you want to customize your computer, you can use a configuration program called SETUP, which is contained within the BIOS on the system board.

SETUP allows you to change the settings for your hardware configuration, security options, and power-saving features. The configuration information you enter is stored in the computer's ROM (read-only memory) and is backed up by a battery, so it is not erased when you turn off or reset your computer.

You may also want to install drivers and utilities for the built-in PCI IDE interfaces and the built-in PCI local bus video interface. You only need to install these drivers if you're using an operating system other than Windows.

This chapter describes the following procedures:

- Starting the SETUP program
- Using the System Setup option to set basic system functions
- Using the Fixed Disk Setup option
- Using the Advanced System Setup options
- Setting the Boot options
- Selecting the Security and Anti-Virus options
- Using the Green PC features
- Exiting SETUP
- Installing the PCI IDE drivers
- Installing video drivers.

## **Starting the SETUP Program**

When you start your computer, it performs some power-on diagnostics. During these diagnostics, you may see the following message:

**Press <DEL> to enter SETUP**

Press Del. This message is only on the screen for a few seconds. If you missed it, restart your computer and try again.

If, during power-on diagnostics, the system detects an error in your system configuration, you hear two beeps and see an error message followed by this message:

**Press <F1> to resume, <DEL> to run SETUP**

Press Del to run SETUP and correct the problem.

SETUP displays the Main Menu, which allows you to select various options to identify your system's configuration and then save your new values. You can also cancel any changes you have made and restore the default values stored in ROM or load the previously stored values.

The table below lists some of the keys you can use to perform SETUP operations.

*SETUP function keys*

Press	To
↑↓←→	Move the cursor to the next or previous modifiable option
Home or End	Move the cursor to the top or bottom of the menu
F1 or Alt H	Display a help screen describing the option currently selected
PgDn or -	Select the previous value
PgUp or + or Spacebar	Select the next value
F5	Supply the previously saved values for the SETUP options on the current screen
F6	Supply the factory default values for the SETUP options on the current screen
F10	Ignore any changes you have made on the current screen and exit the screen
Enter	Select the current option or value
Esc	Return to the previous screen

While you are in SETUP, the bottom of the screen lists the keys you can press to perform specific functions.

## ***Using the System Setup Option***

When you select the System Setup option, you see the System Setup screen. From this screen, you can set the system time and date, define your video display type, check system memory, define the diskette drives, and control keyboard testing during system startup.

The System Setup options are described in the table on the next page.

## *System Setup options*

Option	Settings	Description
System Time System Date	<i>hh:mm:ss</i> <i>mm dd, yyyy</i>	Sets the time and date: once they are set, you should not need to change them, unless you adjust the time for daylight savings or a different time zone (the computer automatically changes the date for leap years)
Video System	EGA/VGA * Monochrome CGA 80X25	Defines the type of display you are using: if you have connected a VGA or SVGA monitor to the built-in monitor port, select EGA/VGA (1)
System Memory Extended Memory	<i>system memory size</i> <i>extended memory size</i>	<i>Detects and displays system and extended memory size automatically: you cannot change these values (2)</i>
Diskette Drive A and B	3.5 inch, 1.44MB * (A) 3.5 inch, 720KB 5.25 inch, 1.2MB 5.25 inch, 360KB 3.5 inch, 2.88MB Not installed * (B)	Defines the types of diskette drives installed as drives A and B
Keyboard	Installed * Not installed	Enables or disables keyboard testing during power-on diagnostics: select Not Installed if you plan to use your system without a keyboard (as a network server, for instance) so you do not receive keyboard errors

\* Default setting

- (1) If you installed a video adapter card, make sure you disable the on-board SVGA controller by setting jumper JP50 to position 2-3; see "Changing the Jumper Settings" in Chapter 4 for instructions.
- (2) If the system memory and Extended memory values are not correct, check that the SIMMs are securely seated in their sockets, as described in "Installing Memory Modules (SIMMs)" in Chapter 4.

## **Using the Fixed Disk Setup Option**

The **Fixed Disk Setup** option defines the types of hard disk drives connected to the primary and secondary IDE interfaces in your system. When you select this option, you see the Fixed Disk Setup screen.

### **Note**

These options do not configure other IDE devices, such as CD-ROM drives, connected to the secondary IDE interface.

### *Fixed Disk Setup screen options*

If any of the drives you installed are larger than 528MB, make sure the **Large Disk Access mode** option is set to **DOS** (the default setting). Set this option to **Other** if you are using UNIX® or an operating system other than MS-DOS® or Windows.

From this screen, you can configure each of the installed drives by selecting them at these options:

**IDE Adapter 0 Master**  
**IDE Adapter 0 Slave**  
**IDE Adapter 1 Master**  
**IDE Adapter 1 Slave**

The IDE Adapter 0 drives are the master and slave drives connected to your primary IDE interface. The IDE Adapter 1 drives are connected to the secondary IDE interface.

### *Individual drive options*

Your computer comes with a hard disk auto-sensing feature. To use it, select one of the drives you have installed from the Fixed Disk Setup screen. On the screen that appears for that drive, press Enter to select the **Autotype Fixed Disk** option. The system detects the type of hard disk drive, fills in the drive's parameters, and sets the remaining options on the screen.

Some older drives may not support the auto-sensing feature. If the drive parameters sensed by the computer do not match your drive, define your own drive type or reformat the disk. You may also need to set the remaining options on the screen. See the next section for instructions on defining your own drive type.

The **Multi-Sector Transfers** option sets the number of sectors per block that the hard disk uses in multiple sector transfers. The auto-sensing feature sets this option appropriately for your drive.

The **LBA Mode Control** option enables or disables ISA logical block address control mode for each drive. Select **Enabled** if your drive is larger than 528MB and supports LBA mode. If you have a large drive that does not support LBA mode, you may not be able to use the drive's full capacity. The auto-sensing feature sets this option appropriately for your drive.

The **32 Bit I/O** option enables the 32-bit I/O transfer rate for data read from the disk. The auto-sensing feature sets this option appropriately for your drive.

### *Defining your own drive type*

If the parameters for your hard disk are not detected by the auto-sensing feature, you must define your own drive type.

To define your own drive type, follow these steps:

1. Move the cursor to **Type** and select User.
2. Type the values in each field that are appropriate for your hard disk drive.
3. When you leave SETUP, make sure you save your changes.

## **Using the Advanced System Setup Options**

When you select the **Advanced System Setup** option, you see the Advanced System Setup screen, from which you can configure the computer's integrated peripheral devices (such as the parallel and serial ports), cache memory, shadow memory, the advanced chip set features, and PCI devices. To avoid possible configuration problems, it is a good idea to leave these options at their default settings.

The **Plug & Play O/S** option is set to Yes at the factory

The **Reset Configuration Data** option is set to Yes at the factory. The system resets this option to No after you run Windows 95 for the first time. If you are using Windows 95, reset this option to Yes whenever you upgrade your computer or install a new component.

### *Configuring integrated peripherals*

Select **Integrated Peripherals** from the Advanced System Setup menu to configure your serial port addresses, parallel port address, diskette drive controller, and parallel port mode.

The **Integrated Peripherals** options are described in the table below.

*Integrated peripherals options*

Option	Settings	Description
COM Port 1 COM Port 2	3F8, IRQ4 * (COM1) 2F8, IRQ3 * (COM2) 338, IRQ4 238, IRQ3 3E8, IRQ4 2E8, IRQ3 2E8, IRQ4 2E0, IRQ3 220, IRQ4 228, IRQ3 Auto Disabled	Assign the address for the built-in primary and secondary serial ports: the Auto setting detects any optional ports you may have installed and sets the built-in ports automatically based on the optional port settings to avoid conflicts (if no optional ports are installed, Auto sets the built-in ports to their default settings): the Disabled setting disables the port
LPT Port	378, IRQ7 * 278, IRQ7 Auto Disabled	Assigns the address for the built-in parallel port: the Auto setting detects any optional ports you may have installed and sets the built-in port automatically based on the optional port settings to avoid conflicts (if no optional ports are installed, Auto sets the built-in port to the default setting): select Disabled to disable the port
LPT Mode	Standard Bi-Directional * ECP	Selects unidirectional AT mode Selects PS/2 bidirectional mode Selects Extended Capabilities Port bidirectional mode
Floppy Controller	Enabled * Disabled	Enables or disables the built-in diskette drive controller

\* Default setting

## *Configuring cache memory*

Enabling cache memory improves system performance when retrieving and processing large amounts of data on systems with external cache installed. To avoid possible configuration problems, leave these options at their default settings unless a peripheral you have installed requires that you make changes. See your peripheral documentation for information.

The table below lists the memory cache options.

*Memory cache options*

Option	Settings	Description
Cache Auto Configuration	Enabled* Disabled	Enables or disables automatic assignment of cache speed
External cache	Enabled * Disabled	Enables or disables the system's external (secondary) caching
System BIOS cacheable	Enabled * Disabled	Enables or disables caching of the system BIOS memory area
Video BIOS cacheable	Enabled * Disabled	Enables or disables caching of the video BIOS memory area
L2 cache write back	Enabled * Disabled	Selects write-back mode for external (secondary) cache Selects write-through mode for external (secondary) cache
Cache speed	3-2-2-2* 3-1-1-1 2-2-2-2 2-1-1-1	Sets the number of cycle times to be inserted during read/write operations (can set only if Auto Configuration is disabled)

\* Default setting

## *Configuring shadow memory*

You can enable video BIOS shadowing or configure shadowing for specific option ROM memory blocks.

### Note

For the best system performance, always leave the **System shadow** and **Video shadow** options set to **Enabled** (the default setting).

Your computer can access RAM faster than ROM. The options on this screen allow your system to copy the contents of its video ROM and any optional ROMs into RAM. When you use shadowing, your system can perform certain operations faster, providing a significant increase in performance.

### Note

Some option ROMs cannot be shadowed; see the documentation that came with your optional equipment for information on shadowing the option's BIOS ROM.

## *Configuring the advanced chipset*

You can change values in the chipset register to optimize performance. However, to avoid possible configuration problems, it is a good idea to leave these options at their default settings.

The table below lists the advanced chipset options.

#### *Advanced chipset control options*

Option	Settings	Description
Chipset Auto Configuration	Enabled * Disabled	Enables or disables automatic assignment of DRAM wait states
DRAM Read/Write wait state	0 1 <b>2*</b> 3	Sets the number of wait states inserted when the CPU reads or writes data into the local DRAM: fewer wait states improve system performance (can only be set if Auto Configuration is disabled)

\* Default setting to provide optional performance with most configurations

#### *Configuring PCI devices*

Select **PCI** Devices from the Advanced System Setup screen to configure the devices connected to the PCI option slots in your computer. The default settings work well for most configurations. You can, however, set the PCI device options listed in the table below.

#### *PCI device options*

Option	Settings	Description
PCI Auto Configuration	Enabled * Disabled	Enables or disables automatic assignment of PCI control values
PCI Control: (HCLK PCICLK)	1 1 * 1½	Selects the speed of the clock control bits on the ISA bridge controller chip
PCI-ISA BCLK Divider	PCICLK 1/4 * PCICLK 1/3 PCICLK 1/2	Determines the PCI bus clock cycle time input to the ISA bus controller
PCI Devices, Slot #1 and Slot #2 options		Allow you to specify whether the device is a master or not, and select the latency timer default or set the lowest I/O address that PCI cards may use

\* Default setting

## **Setting the Boot Options**

When **you** select **Boot Options** from the Main Menu, you see the Boot Options screen, which allows you to define the drive boot sequence and determine which power-on diagnostic tests the computer performs when you start your system.

The **Boot sequence** option determines the order in which the computer checks the drives for an operating system when you turn it on or reset it. The table below describes the available options.

*Boot sequence option settings*

Option	Description
A: then C: *	Loads operating system from drive A; if it isn't there, loads it from drive C (recommended setting)
C: then A:	Loads operating system from drive C; if it isn't there, loads it from drive A
C: only	Loads operating system from drive C

\* Default setting

The **Floppy check** option allows you to speed up the boot process by disabling power-on diagnostic checking of the diskette drive type. The default setting for this option is **Enabled**; however, you should select **Disabled** if you set the **Boot sequence** option to **C: only**.

### **Note**

If you set the **Boot sequence** option to **C: only**, you will not be able to start your system when there is a problem with your hard disk drive.

## **Selecting the Security and Anti-Virus Options**

When you select Security and Anti-virus from the Main Menu, you see the Security and Anti-Virus screen, which allows you to set passwords and other options, as described below.

### *Selecting password types*

You can define both User and Supervisor password levels for this system. If this computer will be used by more than one person, you may want to set a Supervisor password for yourself and a User password for others you don't want to have complete access to the system. This allows you to restrict access to the computer's diskette drives or the virus protection features.

You must set the Supervisor password before you can set a User password.

See the next sections for instructions on selecting the type of password prompting you want and on entering, changing, or deleting passwords.

#### **Note**

If both a Supervisor password and a User password are enabled, SETUP displays options for setting the User password only to users who logged on with a User password.

### *Selecting pass word prompting*

If you enable the Password on boot option, you must enter the Supervisor or User password each time you turn on the system. If you disable this option, but you've defined passwords, you must enter the password each time you start SETUP.

## *Entering or changing passwords*

To specify a User password, you must first specify a Supervisor password. Follow these steps to enter or change a password:

1. Select Set Supervisor Password and press Enter.
2. You see a Set Supervisor Password window. Type a password of up to seven characters and press Enter.
3. Type the same password a second time and press Enter. You see a message that your changes have been saved.
4. Press the spacebar. The Supervisor Password option now displays Enabled.

To set a User password, select the Set User Password option as you follow the steps above.

## *Deleting passwords*

To delete your passwords, follow these steps:

1. Set the Password on boot option to Disabled.
2. Delete the User password by pressing Enter for both the password field and the confirmation field. Don't type any characters in these fields.
3. Then delete the Supervisor password the same way.

### **Note**

If you set both a User and Supervisor password, you must delete the User password before you can access the Supervisor password option.

If you forget your password, see “Password Problems” in Chapter 7.

## *Using the virus protection features*

The **Diskette access** option allows you to restrict access to your diskette drives based on the password levels you have defined. This prevents unauthorized users from accessing the drives and possibly introducing a virus to your system. You can restrict diskette access only if passwords are enabled and you have enabled the **Password on boot** option.

If you select **Supervisor** for this option (the default setting), you can access the diskette drives only if you enter the Supervisor password when you start your system. Users who start the system with a User password, however, will see an error message when they try to access the diskette drive. If you select **User** for the **Diskette access** option, you can access the diskette drives whether you enter the Supervisor or User password when you start the system.

### **Note**

To use passwords for diskette drive access, you must enable the **Password on boot** option. If you select a password level for **Diskette access**, but leave the **Password on boot** option disabled, you see an error message whenever you try to access your diskette drive.

You can also protect your system by selecting **Write protect** for the **Fixed disk boot sector** option. When this option is enabled, the system displays an error message when a program tries to write to the boot sector of your hard disk drive. To use a program designed to write to the boot sector (such as the Format command), you must select **Normal** (the default setting) for the **Fixed disk boot sector** option.

## **Using the Green PC Features**

Select **Green PC Features** from the Main Menu to view the Green PC Features screen. The options on this screen allow you to control the computer's Energy Star compliant, power-saving features described in the table below. For more information about the energy-saving operations of your computer, see "Using Your Green PC Features" in Chapter 3.

*Green PC options*

Option	Settings	Description
Power Saving Mode	Enabled * Disabled	Enables or disables all of the computer's power-saving features: you must enable this option to set the rest of the features described in this table
System Doze Timer	15 seconds * 30 seconds 1 minute 2 minutes 4 minutes 8 minutes Disabled	Sets the time period of system inactivity after which the system enters Doze mode or allows you to disable entry into Doze mode
System Standby Timer	2 minutes* 4 minutes 8 minutes 16 minutes 32 minutes 64 minutes 128 minutes 256 minutes 512 minutes Disabled	Sets the time period of system inactivity (following the Doze period) after which the system enters Standby mode or allows you to disable entry into Standby mode

*Green PC options (continued)*

Option	Settings	Description
System Suspend Timer	2 minutes* 4 minutes 8 minutes 16 minutes 32 minutes 64 minutes 128 minutes 256 minutes 512 minutes Disabled	Sets the time period of system inactivity (following any Doze and Standby periods that are set) after which the system enters Suspend mode or allows you to disable entry into Suspend mode
VGA with Power Down feature	VESA DPMS Standard None *	Selects the method the VGA chip uses to enter Doze mode
Non_SMI CPU support	Generate IRQ10 * Generate IRQ15	Allows the ISA bus bridge controller to replace the System Management Interrupt (SMI) request when a non-system management mode CPU is used, for instance, an Intel® DX, SX, or DX2 processor
IDE Hard Disk Standby Timer **	Disabled 1 to 15 minutes 15 minutes *	Sets the time period of hard disk drive inactivity after which the hard disk enters Standby mode or allows you to disable the hard disk standby timer
System enters Doze/Standby modes by VGA access event	On Off *	Enables or disables checking of video activity to determine whether the system enters a power-saving mode
System wakeup from Suspend modes by (list of 13 sources of SMI access)	On* Off	Selects the SMI access events from which the system exits Suspend modes: you can set each type of event to On or Off

\* Default setting

\*\* Some hard disk drives do not support a low-power standby mode. Also, the delay caused by the hard disk drive returning to active mode may cause errors in some applications. If you have problems, you may want to disable the **Hard Disk Standby Timer** option (**Disabled** is the default setting).

## ***Exiting SETUP***

When you leave SETUP, you can save your settings or exit SETUP without saving your settings. You can also return all values to the factory defaults.

To leave SETUP, press **ESC** from any SETUP screen. From the SETUP Main Menu, you can perform the functions described in the table below.

### *Exiting SETUP options*

Option	Description
Load ROM Default Values	Loads the factory default settings stored in ROM back into CMOS. If you change your system configuration using the SETUP program and then have problems, you can load ROM values to boot the system and start over.
Load Values from CMOS	Loads the current values stored in CMOS for all SETUP options. This ignores any changes you have made through SETUP.
Save Values to CMOS	Saves the changes you have made to your configuration to CMOS.

You can also select these options from the Main Menu. Press **ESC** to exit SETUP and restart your computer.

## ***Installing the PCI IDE Drivers***

All the files and drivers you need for the operating system on your computer are already installed. If you switch to another operating system, such as NetWare®, you may want to install PCI IDE drivers, which let you take advantage of the high-speed performance available through your system's IDE interfaces for hard disk drives and other IDE devices.

In order to install the drivers, you need to create install diskettes using the utility program on your computer. See the *User's Digest* for instructions. Once you create the diskettes, you can install drivers for these programs:

- MS-DOS
- Windows
- Windows NT
- OS/2® versions 2.0 and higher (2.X)
- SCO®UNIX versions 3.2.4 and higher (3.2.4.X)
- Novell®NetWare versions 3.1 and higher (3.1X)
- Novell NetWare versions 4.0 and higher (4.0X).

Before you install the PCI IDE drivers, make sure you back up your hard disk drive. Then use the installation program on the PCI IDE drivers diskette to install the drivers.

**Note**

Make sure you use the installation program to install the PCI IDE drivers. If you simply copy the driver files, they won't work correctly.

The driver files for each of the programs listed above are in their own directory on the diskette. Log onto the directory for each driver you want to install and print out the README file. Refer to the information in these files for additional instructions on installing and using the PCI IDE drivers.

## ***Running the Installation Program***

Follow these steps to install the PCI IDE drivers:

1. Insert the PCI IDE Drivers diskette in drive A.
2. Access the DOS prompt, if you are not there already
3. Type **A:** and press Enter to log onto drive A.
4. Type **INSTALL** and press Enter.
5. Follow the instructions on the screen to install the PCI IDE drivers on your hard disk.

### **Note**

Not all hard disk drives can take full advantage of the PCI IDE interface. To take advantage of this feature, your hard disk drive must support the ATA-2 standard and a 32-bit data path. If the drive is larger than 528MB, it also must support LBA. If you need information on your hard disk drive, see the hardware specifications for the drive or contact the drive manufacturer and request a product specification.

## ***Installing Video Drivers***

Your system already includes Windows video drivers that let you take full advantage of the performance your computer's built-in SVGA controller can offer.

If you want to install video drivers for DOS applications, you can create install diskettes using the utility program on your computer. See the *User's Digest* for instructions on using the diskette creation utility. Once you create the video drivers diskettes, follow the instructions in the README file on the diskettes.

To obtain drivers for additional applications or new drivers as they become available, contact the EPSON Connection or access one of EPSON's electronic support services.

## *Chapter- 3*

# ***Using Your Computer***

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This chapter describes the following operations:

- Working comfortably
- Backing up your files
- Using energy wisely
- Using your Green PC features
- Inserting and removing diskettes
- Stopping a command or program
- Resetting the computer
- Using a password.

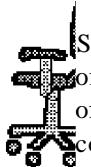
## ***Working Comfortably***

If you spend a lot of time at your computer, you may experience occasional fatigue or discomfort caused by repetitive motions or too much time spent in one position. If you follow the guidelines in this section, you may avoid these problems and actually increase your productivity.

Take a few minutes to read this section for suggestions about:

- Using the right furniture
- Positioning your monitor
- Lighting your workspace
- Using a keyboard and mouse
- Maintaining good posture and work habits.

## ***Using the Right Furniture***



Selecting a good desk and using the right type of chair can make a big difference in your level of comfort. When you set up your furniture, consider these suggestions:

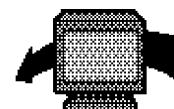
An L- or U-shaped desk configuration works well because it provides ample space to hold your computer equipment and work materials while keeping everything within easy reach. A split-level desk or one with a pull-out keyboard drawer lets you place the keyboard in a comfortable typing position.

Since you'll usually be sitting when you use your computer, it's important to have a good chair. An adjustable chair allows you to support your body in the correct position. Make sure the chair supports your lower back; the backrest should fit the curvature of your spine. To reduce fatigue, try to use a chair with adjustable, padded armrests so you can occasionally rest your arms while you work.

Make sure the seat and backrest are wide enough so you can sit in a variety of positions throughout the day. Also leave enough room under the work surface so you can vary the position of your legs.

Adjust the height of your chair so when you are using the keyboard or mouse your upper arms are vertical and your forearms and wrists are horizontal. For good circulation, your feet should rest flat on the floor with your lower legs vertical and your knees level with your hips. You may need to use a footrest to maintain the correct alignment for your legs.

## ***Positioning Your Monitor***



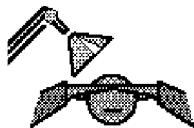
Place the monitor so it is directly in front of you with the top of the screen slightly below eye level when you are sitting at the computer. You may want to place it on top of the computer or on a stand.

Your line of sight to the screen should be about 10 to 20 degrees below the horizontal. If the monitor has a tilt and swivel base, you can adjust the position of the screen for the best viewing angle.

Sit about an arm's length or more away from the monitor. The most comfortable viewing distance depends on the size of the screen characters and your ability to focus on the display.

Adjust the monitor's brightness and contrast controls to maximize image clarity, and keep the screen clean.

Try placing any source documents you are using on a copy stand and position the stand next to the screen at the same eye level. This reduces neck strain and makes it easier for your eyes to move back and forth between the document and the screen.



## ***Lighting Your Workspace***

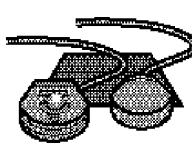
Appropriate lighting increases your comfort and productivity, and it's good for your eyes.

Arrange your computer and light sources to minimize glare and bright reflections.

Position the monitor so that any windows in the room face the sides of the monitor, not the front or back. This will help reduce glare.

For working at the computer, indirect or shielded lighting is best, and it should light your entire office equally. Make sure the lighting is not too bright, because this can make your eyes tired from continually readjusting between the relative dimness of the screen and the bright surroundings. You can use window blinds, shades, or drapes to control the amount of daylight in the room or reduce overhead lighting by turning off or dimming the lights.

Here is a simple way you can test your lighting. While looking at the screen, use your hand to shield your eyes from the brightest light source in the room (such as a window or overhead light). If you feel a sense of relief, no matter how small, your current lighting is too bright.



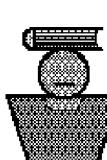
## ***Using the Keyboard and Mouse***

Constant use of a keyboard, mouse, or any pointing device can lead to a variety of aches and strains. To prevent injury, keep your hands relaxed and rest them frequently.

Try to keep your fingers parallel with your forearms to prevent straining your wrists. Adjust the angle of the keyboard so the slope is no more than 25 degrees. (The keyboard has legs on the bottom which allow you to adjust the angle.)

Keep your hands and fingers relaxed when you are typing and try not to press the keys too hard; using too much force creates tension in your hands. Remove your hands from the keyboard when you are not using it and take frequent breaks to stretch your hands and fingers.

When using a mouse, keep your wrist and fingers relaxed. Let go of the mouse frequently and stretch or relax your hand. Leave enough space on your work surface so you can freely move the mouse.



## ***Maintaining Good Posture and Work Habits***

Here are suggestions to help you stay fit while using your computer. If you form good work habits, you shouldn't have to spend too much time thinking about it!

- Work in a relaxed, natural, upright position and let the chair support you. Your back and neck should be straight with your shoulders down and relaxed. Keep the elbows and hips bent at about a 90 degree angle and your forearms and thighs parallel to the floor.
- Try to keep your arms in an easy, natural position with your elbows near your body and level with or slightly lower than the keyboard. Your wrists should be straight, not bent, and your hands should rest lightly on the keys or the mouse.
- Rest your eyes occasionally by closing them or focusing on a fixed spot in the distance.
- Change your sitting position frequently throughout the day to avoid muscle fatigue. Take periodic breaks; stand up, stretch, and move around.

## ***Backing Up Your Files***

To protect your data, it is a good idea to back up your files regularly. You should also make backup copies of any diskettes you have that contain programs (your system may have come with a utility installed on the hard disk drive to do this for you) and store the copies away from your originals.

You can use any backup program or the backup utility in your operating system. Read the online help or the software documentation for instructions.



## ***Using Energy Wisely***

By purchasing this low-power, Energy Star compliant computer, you join a growing number of users concerned about conserving energy. Here are a few additional tips you can use to be even more energy-wise:

- If your printer and monitor aren't Energy Star compliant, turn them off when you're not using them.
- Use the print preview option on your software before you print something. You'll be able to catch formatting errors before you commit them to paper.
- If you have an electronic mail system available to you, send E-mail rather than memos. Not only is this faster, but you'll save paper and storage space too.
- Use recycled paper whenever you can and, if possible, reuse or recycle used paper instead of throwing it away.

## ***Using Your Green PC Features***

Your computer includes features that lower the power usage of the microprocessor and other components when the system has been inactive for a selected period of time. Using the SETUP program, you can customize inactivity timers for three power-saving modes: Doze, Standby, and Suspend. Each of the three modes provides progressively increased levels of power conservation.

You can also customize an individual Standby timer for the hard disk drive. If you have an Energy Star compliant monitor, your computer places the monitor in power-saving modes too. See “Using the Green PC Features” in Chapter 2 for information on customizing these options.

The power-saving operations performed by your computer in each of the power-saving modes are summarized in the table below.

*Power-saving modes*

Mode	Power-saving operations
Doze	The processor slows down
Standby (disabled by default)	The processor speed slows further and the monitor screen goes blank (the monitor is placed in a low power consumption mode only if it is Energy Star compliant)
Suspend	The processor clock stops, the hard disk drive(s) power down, and the monitor screen goes blank (the monitor is placed in a low power consumption mode only if it is Energy Star compliant)

### ***Note***

Some processors do not support power-saving modes; in these cases only the hard disk drive and monitor can take advantage of your green PC features.

To resume activity when your system is in a power-saving mode, press a key or move the mouse. If your system was in Doze mode, the monitor immediately displays and you can access your system right away.

If your system was in Suspend mode, it takes a few moments for the monitor to display and for the hard disk drive to return to active mode. You'll hear it start again. It takes a few seconds for the drive to reach its full operating speed and read or write to the disk

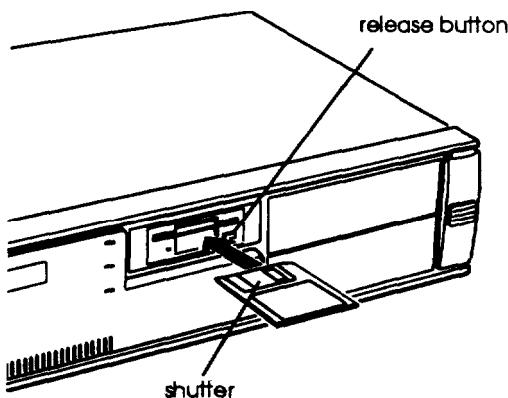
**Note**

Some hard disk drives do not support low-power modes. Also, the delay caused by the hard disk drive returning to active mode may cause errors in some applications. If you have problems, you may want to disable the standby timer for the hard disk drive.

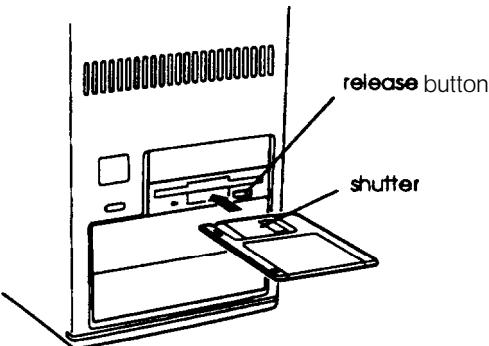
## ***Inserting and Removing Diskettes***

To insert a diskette into a 3.5-inch drive, hold the diskette with the label facing up and the shutter leading into the drive, as shown in the following illustrations. Slide the diskette into the drive until it clicks into place.

**Slimline  
computer**



*Tower  
computer*



When you want to remove the diskette, make sure the drive light is off; then press the release button. Remove the diskette and store it properly.

***caution***

Never remove a diskette, reset the computer, or turn it off while a diskette drive light is on. You could lose data. Also, remove all diskettes before you turn off the computer.

## ***Stopping a Command or Program***

You may sometimes need to stop a command or program while it is running. If you want to stop a DOS command or DOS application program, try one of the following from the DOS prompt:

- Press Pause
- Press Ctrl C
- Press Ctrl Break

If you are using Windows, press Ctrl Alt Del and follow the instructions on the screen.

If these methods do not work, you may need to reset the computer.

Do not turn off the computer to exit a program or stop a command unless you have to, because the computer clears any data you did not save.

## ***Resetting the Computer***

Occasionally, you may want to clear the computer's memory without turning it off. You can do this by resetting the computer.

For example, if an error occurs and the computer does not respond to your keyboard entries, you can reset it to reload your operating system and try again. However, resetting erases any data in memory that you have not saved; so reset only if necessary.

### **Caution**

Do not reset the computer to exit a program. Some programs classify and store new data when you exit them. If you reset the computer without properly exiting a program, you may lose data.

To reset your computer, press Ctrl Alt Del and then follow the instructions on the screen. You can also press the RESET button. The screen displays nothing for a moment, and then the computer reloads the operating system.

If resetting the computer does not correct the problem, you probably need to turn it off and on again. Remove any diskette(s) from the diskette drive(s). Turn off the computer and wait 20 seconds. Then turn on the computer.

## ***Using a Password***

Using SETUP, you can define both a Supervisor level password and a User level password. You can also specify whether a password is required when you start the system. This password can control who has access to the diskette drives.

If you enabled the **Password on boot** option in SETUP, you must enter the Supervisor or User password every time you turn on or reset the computer. If you enter a password but disable the **Password on boot** option, you must enter the password when you start SETUP.

If you set the **Diskette access** option to Supervisor, you can access a diskette drive only if you entered the Supervisor password when you started your system. If you entered a User password when you started the system but the **Diskette access** option is set to Supervisor, you see an error message when you access the diskette drive.

When you need to enter your password, you'll see the Security Check window containing this prompt:

**Enter password:**

As you type your password, you see a rectangle for each character you type. When you press Enter, the computer loads the operating system (or starts SETUP).

If you don't enter the correct password the first time you type it, you can try two more times. If you haven't entered the correct password on the third try, the computer locks up to prevent unauthorized access. You see the message:

**SYSTEM DISABLED**

You must either turn off the computer or press the RESET button to start over. In this situation, you cannot reset the computer by pressing Ctrl Alt Del.

**Note**

If you want to delete your password, you must run the SETUP program and follow the instructions for deleting a password under "Selecting the Security and Anti-Virus Options" in Chapter 2.

If you do not remember your password, see "Password Problems" in Chapter 7.

## ***Installing and Removing Options***

You can enhance the performance of your computer by adding optional equipment such as option cards, and system, video, or cache memory modules, or by upgrading the processor.

### **↗ Tip**

If you have this manual online only, be sure to print out the chapter before performing any of the procedures it describes.

This chapter describes the following:

- Removing the computer's cover
- Replacing the computer's cover
- Locating the internal components
- Changing the jumper settings
- Installing and removing SIMMs (single in line memory modules)
- Installing and removing option cards
- Adding video memory
- Installing external cache
- Upgrading the processor
- Performing post-installation procedures.

### **Caution**

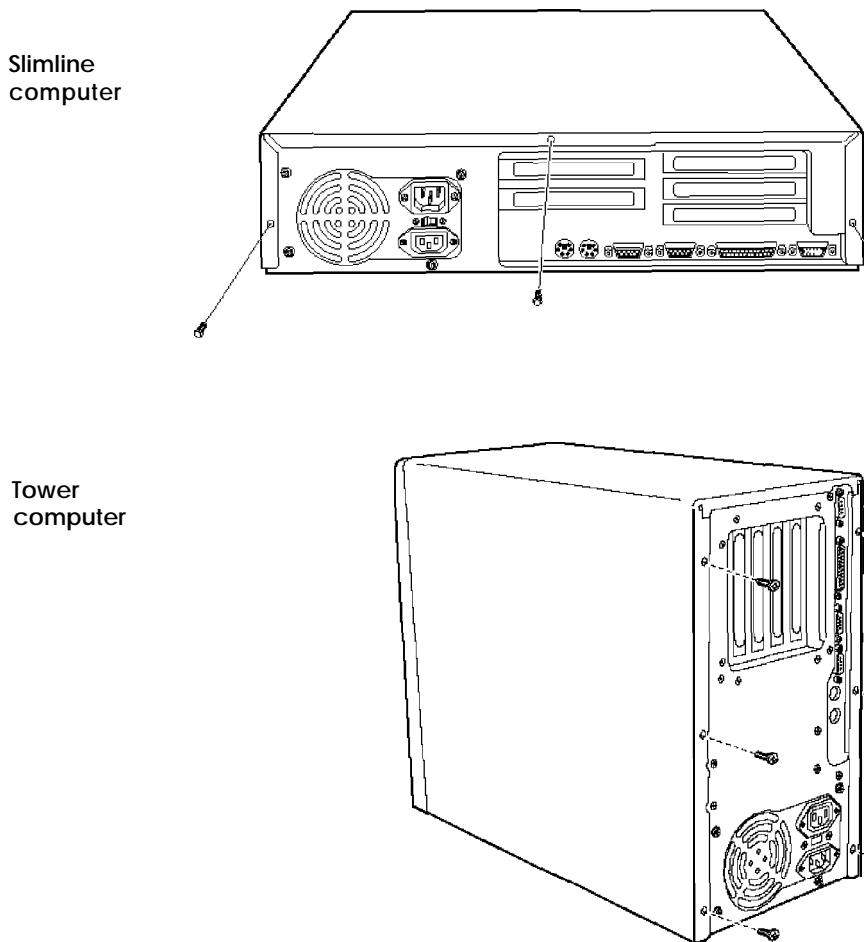
Never install options or change jumper settings when the computer is turned on or the power cable is connected.

## ***Removing the Cover***

You need to remove the computer's cover to install any of the options described or to install or remove a drive (as described in Chapters 5 and 6). Follow these steps:

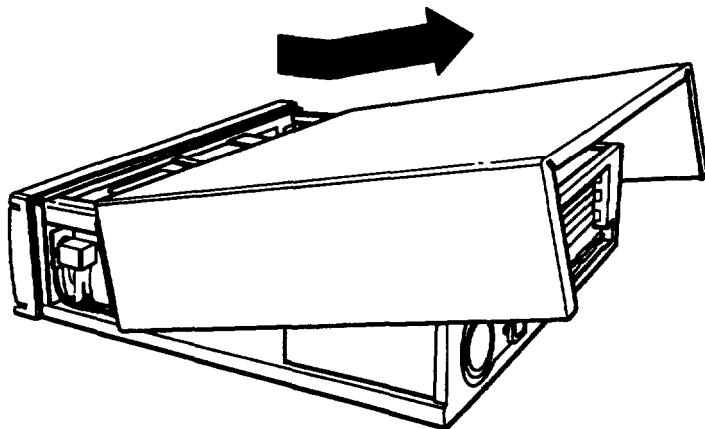
1. Turn off the computer and then any peripheral devices.
2. Disconnect the computer's power cable from the electrical outlet and from the back panel. Also disconnect any other cables that are connected to the computer, including the keyboard cable.
3. If the monitor is on top of the computer, lift it off and set it to one side.
4. Turn the computer around so the back panel is facing you.

5. Remove the screws securing the cover (three on the slim line computer and six on the tower computer), as shown below. Save the screws to secure the cover again when you are through.

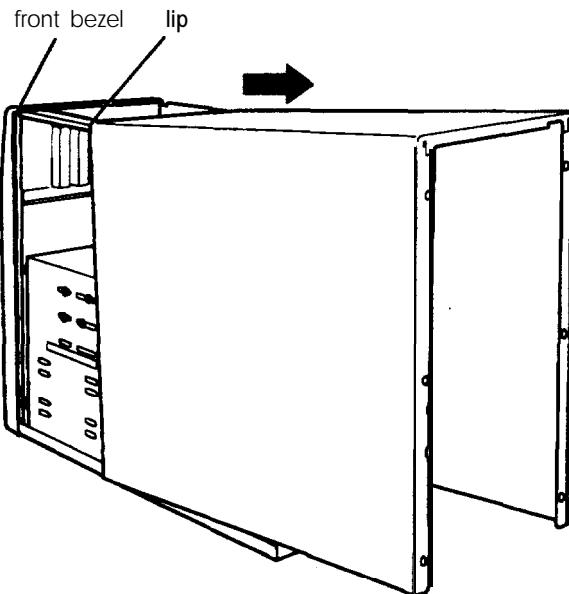


6. Grasp the sides of the cover and lift it off as shown below. For the slimline computer, lift up the cover at an angle and then pull it off. For the tower computer, pull the cover straight back until it clears the case.

Slimline  
computer



Tower  
computer



7. Set the cover aside
8. Ground yourself to the computer by touching the metal surface of the back panel.

**WARNING**

Be sure to ground yourself by touching the back panel of the computer every time you remove the cover. If you are not properly grounded, you could generate an electric shock that could damage a component when you touch it.

## ***Replacing the Cover***

When you are ready to replace the computer's cover, refer to the illustrations above and follow these steps:

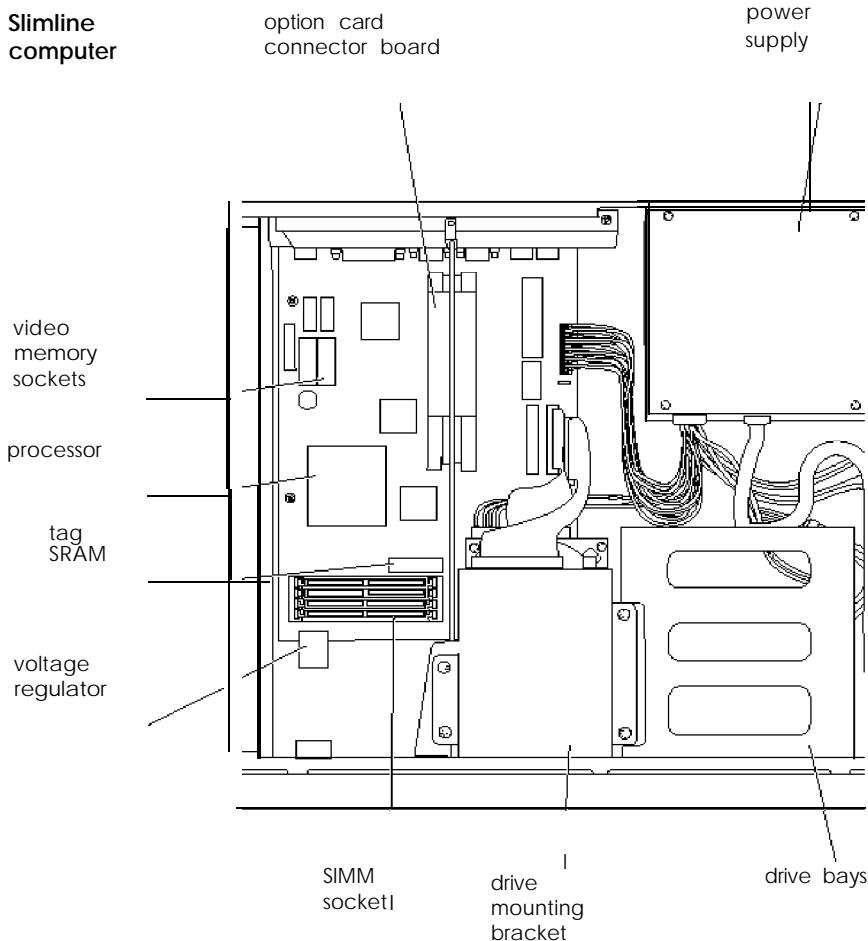
1. Make sure all the internal components are installed properly.
2. Check all cable connections, especially those that might have been loosened during your work. Make sure all cables are out of the way so they do not catch on the cover.
3. For the slimline computer, insert the lip at the front of the cover between the front bezel and the computer case and guide the cover straight down.

For the tower computer, squeeze the sides in and slide the cover forward until the lip at the front of the cover slides between the front bezel and the computer case.

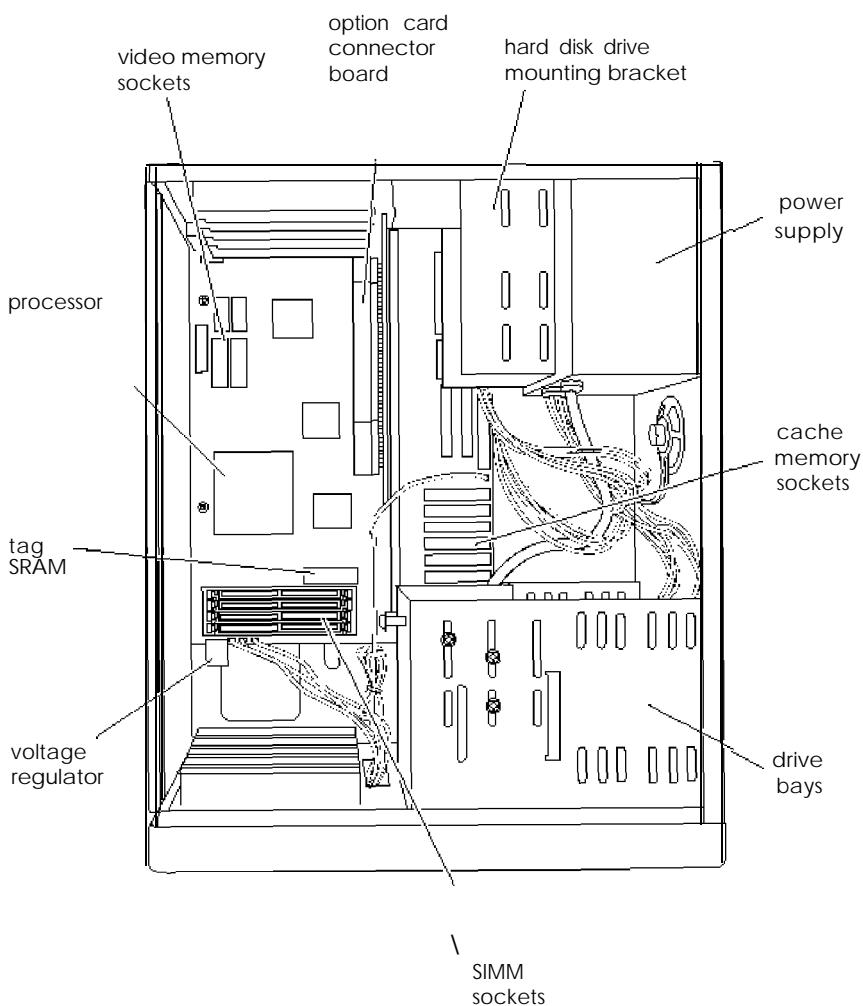
4. Replace the retaining screws.
5. Reconnect the computer to the monitor, printer, keyboard, and any other peripheral devices you have. Then reconnect the power cable to the back of the computer and to an electrical outlet.

## ***Locating the Internal Components***

As you follow the instructions in this chapter, refer to the illustration below to locate the major components inside your computer.

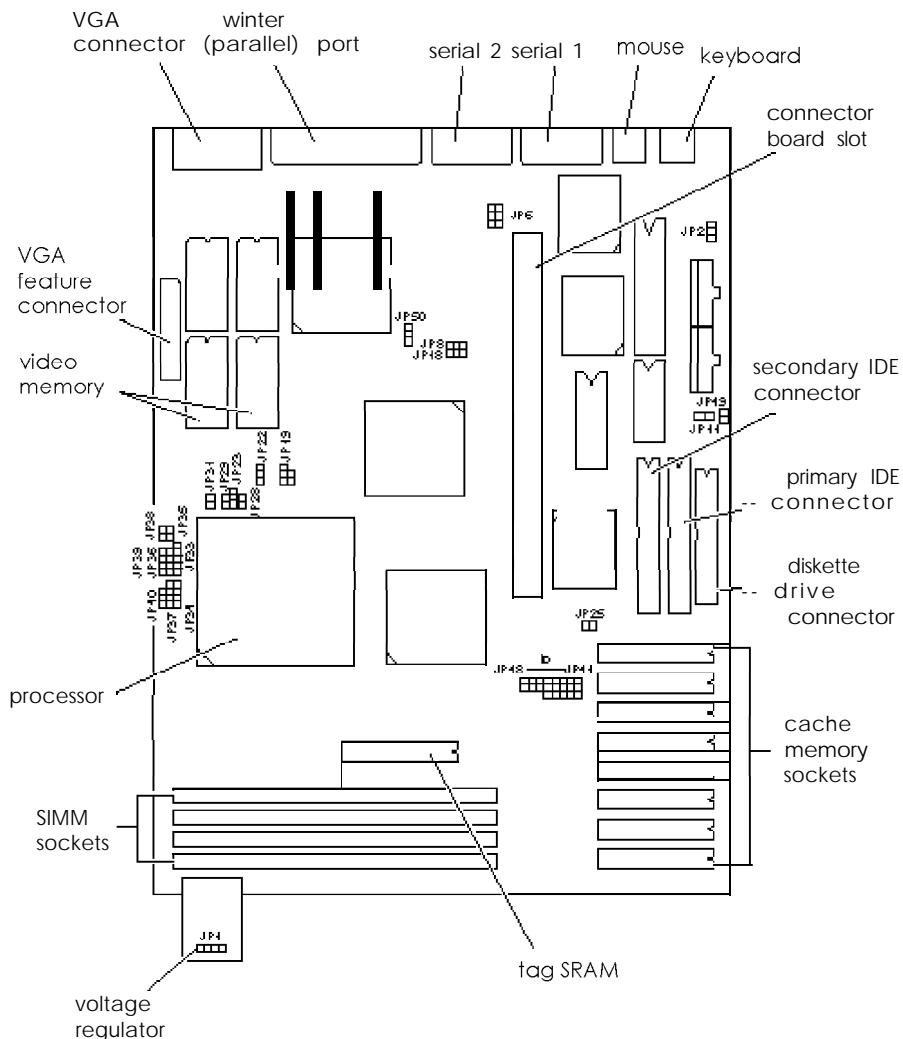


## Tower computer



## **Locating System Board Components**

The illustration below shows the system board inside your computer. Use this illustration to locate jumpers and drive connectors.



## ***Changing the Jumper Settings***

The jumpers on the system board are preset to factory default positions, indicated by an asterisk (\*) in the tables below. (See the illustration under “Locating the System Board Components” to locate jumpers.) Use the information in this section to change jumper settings, if necessary.

### **Note**

Any jumpers not listed in the following tables are for service purposes only. Do not change their settings.

#### *Miscellaneous jumper settings*

Jumper number	Jumper setting	Function
JP2	1-2 *	Enables on-board I/O controller
	2-3	Disables on-board I/O controller
JP25	Off*	Enables PCI IDE controller
	On	Disables PCI IDE controller
JP49	On	Clears CMOS memory (resets SETUP values to factory defaults)
	Off*	Normal CMOS values
JP50	1-2 *	Enables on-board VGA controller
	2-3	Disables on-board VGA controller

\* Default setting

#### *Parallel port ECP mode DRQ jumper-settings*

Function	JP8	JP18
DRQ1 (DACK1)*	1-2	2-3
DRQ4 (DACK3)	2-3	1-2

*CPU type jumper settings*

Jumper number	CPU type									
	Intel or AMD	Intel					Cyrix		UMC	
		486 DX/DX2 or DX4	486SX	Pentium™ OverDrive™	486 SXSL/SX2SL	486DXSL/DX2SL/DX4SL	486DX2 (P24D L1+V[B])	486SX	486 DX/DX2	USS-SUPER
JP19			1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3
JP22	1-2	1-2	2-3	2-3	2-3	2-3	2-3	2-3	1-2	1-2
JP23			1-2					2-3	2-3	
JP28			On							
JP29			On							
JP33			2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-5	1-2, 3-4	1-2, 3-4		
JP34			1-2	1-2	1-2	1-2, 3-4	2-3	2-3		
JP36	1-2, 3-4	2-3	1-2, 3-4	2-3	1-2, 3-4	1-2, 3-4	2-3	1-2, 3-4	2-3	1-2, 3-4
JP37			2-3				1-2	2-3	3-4	3-4
JP38						On				
JP39	1-2		2-3		1-2	1-2		1-2	1-2, 3-4	1-2, 3-4
JP40							2-3	2-3		
JP44	1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3	1-2	1-2
JP45	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2	2-3	2-3

### *CPU voltage jumper settings*

CPU voltage	JP1 (on voltage regulator) *
3.3V	1-2
3.45v	3-4
3.6V	5-6
4.0V	7-8
5.0V	Remove voltage regulator and jumper all pins in socket

\* Default setting depends on installed processor

### *Cache jumper settings*

Cache configuration	JP41	JP42	JP43	JP46	JP47	JP48
128KB (32K x 8 SRAMs in Bank 0)	Off	2-3	1-2	Off	Off	Off
256KB (32K x 8 SRAMs in Banks 0&1)	Off	1-2	2-3	On	Off	Off
512KB (64K x 8 SRAMs in Banks 0&1)	Off	1-2	2-3	On	On	Off
512KB (128K x 8SRAMs in Bank 0)	1-2	2-3	2-3	On	On	Off

### *CPU clock jumper settings*

CPU clock speed	JP6 *
25 MHz	1-2
33 MHz	1-2, 3-4, 5-6
40 MHz	1-2, 3-4
50 MHz	5-6

\* Default setting depends on installed processor

## **Setting the Jumpers**

To change a jumper setting, follow these steps:

1. Refer to the illustration under “Locating System Board Components” to locate the jumpers.
2. If any option cards are installed in your computer, you may need to remove them to access the jumpers. See “Removing an Option Card” for instructions.
3. A jumper’s setting is determined by where the jumper is placed on the pins. Use the table below to identify the pin settings for 2-, 3-, and 4-pin jumpers. (To identify the pin numbers, look at the system board under the jumper.)

*Jumper positions*

Type	Position			
2-pin	On	Off		
3-pin	1-2	2-3	Off	
4-pin	1-2	2-3	3-4	Off

The table illustrates the pin configurations for different types of jumpers. For 2-pin jumpers, there are two positions: 'On' (both pins shorted) and 'Off' (no pins shorted). For 3-pin jumpers, the positions are '1-2' (pins 1 and 2 shorted), '2-3' (pins 2 and 3 shorted), and 'Off' (no pins shorted). For 4-pin jumpers, the positions are '1-2' (pins 1 and 2 shorted), '2-3' (pins 2 and 3 shorted), '3-4' (pins 3 and 4 shorted), and 'Off' (no pins shorted).

For 6-pin jumpers, refer to the 4-pin illustrations and set jumpers accordingly.

To move a jumper from one position to another, use needle-nose pliers or tweezers to pull it off its pins and gently move it to the desired position.

**Caution**

Be careful not to bend the jumper pins or damage any components on the main system board.

4. Replace any option cards you removed, if necessary.  
See "Installing an Option Card" for instructions.
5. Replace the computer's cover as described under "Replacing the Cover."

---

## ***Installing Memory Modules (SIMMs)***

Your computer comes with 4 or 8MB of memory on a SIMM. By installing additional SIMMs, you can increase the amount of memory in your computer up to 128MB.

There are four SIMM sockets on the main system board, and each can contain one memory module. You can install 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB SIMMs. The sockets are labelled on the main system board.

The following table shows the recommended SIMM

*SIMM configurations*

Bank 0 (SIM1)	Type	Bank 1 (SIM2)	Type	Bank 2 (SIM3)	Type	Bank 3 (SIM4)	Type	Total memory
1MB	Single	1MB	Single	—	—	—	—	2MB
1MB	Single	1MB	Single	1MB	Single	1MB	Single	4MB
1MB	Single	1MB	Single	2MB	Double	—	—	4MB
1MB	Single	1MB	Single	2MB	Double	2MB	Double	6MB
1MB	Single	1MB	Single	4MB	Single	—	—	6MB
1MB	Single	1MB	Single	4MB	Single	4MB	Single	10MB
1MB	Single	1MB	Single	8MB	Double	—	—	10MB
1MB	Single	1MB	Single	8MB	Double	8MB	Double	18MB
1MB	Single	1MB	Single	16MB	Single	—	—	18MB
1MB	Single	1MB	Single	16MB	Single	16MB	Single	34MB
1MB	Single	1MB	Single	32MB	Double	—	—	34MB
1MB	Single	1MB	Single	32MB	Double	32MB	Double	66MB
2MB	Double	—	—	—	—	—	—	2MB
2MB	Double	—	—	2MB	Double	—	—	4MB
2MB	Double	2MB	Double	—	—	—	—	4MB
2MB	Double	2MB	Double	2MB	Double	—	—	6MB
2MB	Double	2MB	Double	1MB	Single	1MB	Single	6MB
2MB	Double	2MB	Double	2MB	Double	2MB	Double	8MB
2MB	Double	2MB	Double	4MB	Single	—	—	8MB
2MB	Double	2MB	Double	4MB	Single	4MB	Single	12MB
2MB	Double	2MB	Double	8MB	Double	—	—	12MB
2MB	Double	2MB	Double	8MB	Double	8MB	Double	20MB
2MB	Double	2MB	Double	16MB	Single	—	—	20MB
2MB	Double	2MB	Double	16MB	Single	16MB	Single	36MB
2MB	Double	2MB	Double	32MB	Double	—	—	36MB
2MB	Double	2MB	Double	32MB	Double	32MB	Double	66MB
4MB	Single	—	—	—	—	—	—	4MB
4MB	Single	—	—	4MB	Single	—	—	8MB
4MB	Single	4MB	Single	—	—	—	—	8MB
4MB	Single	4MB	Single	1MB	Single	1MB	Single	10MB

*SIMM configurations (continued)*

Bank 0 (SIM1)	Type	Bank 1 (SIM2)	Type	Bank 2 (SIM3)	Type	Bank 3 (SIM4)	Type	Total memory
4MB	Single	4MB	Single	2MB	Double	—	—	10MB
4MB	Single	4MB	Single	4MB	Single	—	—	12MB
4MB	Single	4MB	Single	2MB	Double	2MB	Double	12MB
4MB	Single	4MB	Single	4MB	Single	4MB	Single	16MB
4MB	Single	4MB	Single	8MB	Double	—	—	16MB
4MB	Single	4MB	Single	8MB	Double	8MB	Double	24MB
4MB	Single	4MB	Single	16MB	Single	—	—	24MB
4MB	Single	4MB	Single	16MB	Single	16MB	Single	40MB
4MB	Single	4MB	Single	32MB	Double	—	—	40MB
4MB	Single	4MB	Single	32MB	Double	32MB	Double	72MB
8MB	Double	—	—	—	—	—	—	8MB
8MB	Double	—	—	8MB	Double	—	—	16MB
8MB	Double	8MB	Double	—	—	—	—	16MB
8MB	Double	8MB	Double	1MB	Single	1MB	Single	18MB
8MB	Double	8MB	Double	2MB	Double	—	—	18MB
8MB	Double	8MB	Double	2MB	Double	2MB	Double	20MB
8MB	Double	8MB	Double	4MB	Single	—	—	20MB
8MB	Double	8MB	Double	8MB	Double	—	—	24MB
8MB	Double	8MB	Double	4MB	Single	4MB	Single	24MB
8MB	Double	8MB	Double	8MB	Double	8MB	Double	32MB
8MB	Double	8MB	Double	16MB	Single	—	—	32MB
8MB	Double	8MB	Double	16MB	Single	16MB	Single	48MB
8MB	Double	8MB	Double	32MB	Double	—	—	48MB
8MB	Double	8MB	Double	32MB	Double	32MB	Double	80MB
16MB	Single	—	—	—	—	—	—	16MB
16MB	Single	—	—	16MB	Single	—	—	32MB
16MB	Single	16MB	Single	—	—	—	—	32MB
16MB	Single	16MB	Single	1MB	Single	1MB	Single	34MB
16MB	Single	16MB	Single	2MB	Double	—	—	34MB
16MB	Single	16MB	Single	2MB	Double	2MB	Double	36MB
16MB	Single	16MB	Single	4MB	Single	—	—	36MB
16MB	Single	16MB	Single	4MB	Single	4MB	Single	40MB
16MB	Single	16MB	Single	8MB	Double	—	—	40MB

### *SIMM configurations (continued)*

Bank 0 (SIM1)	Type	Bank 1 (SIM2)	Type	Bank 2 (SIM3)	Type	Bank 3 (SIM4)	Type	Total memory
16MB	Single	16MB	Single	16MB	Single	—	—	48MB
16MB	Single	16MB	Single	8MB	Double	8MB	Double	48MB
16MB	Single	16MB	Single	16MB	Single	16MB	Single	64MB
16MB	Single	16MB	Single	32MB	Double	—	—	64MB
16MB	Single	16MB	Single	32MB	Double	32MB	Double	96MB
32MB	Double	—	—	—	—	—	—	32MB
32MB	Double	—	—	32MB	Double	—	—	64MB
32MB	Double	32MB	Double	—	—	—	—	64MB
32MB	Double	32MB	Double	1MB	Single	1MB	Single	66MB
32MB	Double	32MB	Double	2MB	Double	—	—	66MB
32MB	Double	32MB	Double	2MB	Double	2MB	Double	68MB
32MB	Double	32MB	Double	4MB	Single	—	—	68MB
32MB	Double	32MB	Double	4MB	Single	4MB	Single	72MB
32MB	Double	32MB	Double	8MB	Double	—	—	72MB
32MB	Double	32MB	Double	8MB	Double	8MB	Double	80MB
32MB	Double	32MB	Double	16MB	Single	—	—	80MB
32MB	Double	32MB	Double	16MB	Single	16MB	Single	96MB
32MB	Double	32MB	Double	32MB	Double	-		
32MB	Double	32MB	Double	32MB	Double	32MB	Double	128MB

- \* If you install SIMMs in both Bank 0 and Bank 1 or Bank 2 and Bank 3, SIMM types must match.

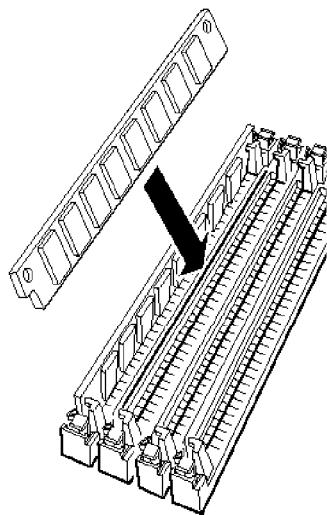
Use only tin-plated, 32-bit, 72-pin, fast-page mode SIMMs that operate at an access speed of 70ns or faster. Be sure all the SIMMs operate at the same speed.

Your SIMM sockets may not look exactly like the ones in the illustrations. If you're not sure how to install SIMMs, contact the EPSON Connection or your Authorized EPSON Servicer and ask for assistance.

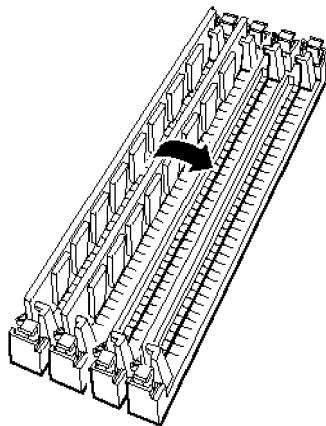
## ***Inserting SIMMs***

Make sure the computer is turned off and the cover is off. Then follow these steps to install SIMMs:

1. Refer to the illustration under “Locating the Internal Components” to locate the SIMM sockets in the corner of the main system board.
2. Remove any option cards that may be blocking your access to the SIMM sockets. (See “Removing an Option Card” for instructions.)
3. Position the SIMM at an angle over the empty socket, with the SIMM components facing the front of the computer.



4. Push the SIMM into the socket until it is seated firmly in the slot. Then tilt it upright, as shown below, guiding the hole at each end of the SIMM over the retaining post at each end of the SIMM socket. If it does not go in smoothly, do not force it; pull it all the way out and try again.

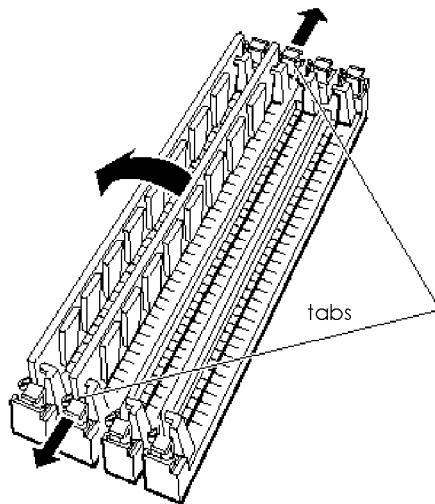


5. Replace any option cards you removed. (See “Installing an Option Card” for instructions.)
6. Replace the computer’s cover as described under “Replacing the Cover.” Then see “Post-installation Procedures” for instructions on configuring your computer with your new memory size.

## **Removing SIMMs**

If you need to remove SIMMs from your computer (to install different ones, for example), follow the steps below:

1. Use the illustration under “Locating the Internal Components” to locate the SIMM sockets in the corner of the main system board.
2. Remove any option cards that may be blocking your access to the SIMM sockets. (See “Removing an Option Card” for instructions.)
3. Use your fingers or a small screwdriver to carefully pull away the tabs that secure the SIMM at each end, as shown below. The SIMM falls to the side; remove it from the socket.



4. Follow the same procedure to remove any other SIMMs.

5. If you are inserting different SIMMs, follow the instructions under “Inserting SIMMs” to install them.
6. Replace any option cards you removed, as described under “Installing an Option Card.”
7. Replace the computer’s cover as described under “Replacing the Cover.” Then see “Post-installation Procedures” for instructions on configuring your computer with your new memory size.

## ***Installing an Option Card***

This section explains how to install option cards in your computer. Your computer has five slots; the three large slots are ISA compatible, and two smaller slots are PCI compatible.

### **Note**

The two PCI slots are identified as PCI1 and PCI2 on the option slot connector card. The computer’s SETUP program refers to the slot number as it configures PCI cards, so note the slot you use for each card you install.

The slot nearest the system board accommodates only a half-length card. On the slim line computer, the slots facing the power supply also accommodate only half-length cards.

### **Caution**

Before you install any option cards in your system, make sure that each card does not draw more current than the limits listed in Appendix A.

As you install option cards, keep these guidelines in mind:

- Make sure you know whether the card you are installing is an ISA card or a PCI card, so you can install it in the correct type of slot.
- If you have an S-bit ISA card, you can install it in a 16-bit ISA slot, as long as it fits.
- Check the components on your card and the system board before deciding which slot to use. Make sure that no components are touching or obstructing other cards or cables.
- When you unpack the option card, do not touch the components on the circuit board or the gold-edged connectors. Place the card gently on top of its original packing material with the component side facing up. Keep the packing materials in case you remove it later.
- Adjust any switches or jumpers on the card, if necessary, before you install it. (See the option card instructions.) Also, see if you need to change any jumpers on the system board, as described under “Changing the Jumper Settings.”

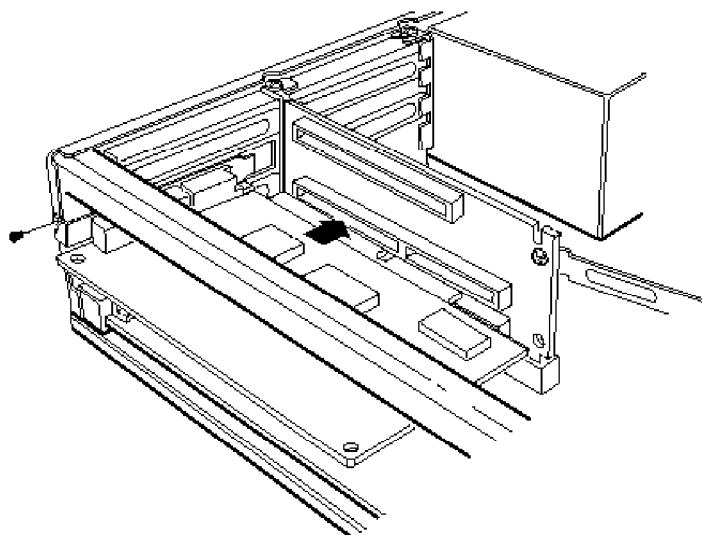
## ***Installing a Card in the Slimline Computer /3-slot Side)***

The option card connector board in the slimline computer has two slots on one side and three slots on the other side.

Although the illustration shows an ISA card, you can use the same instructions for installing a PCI card.

Follow these steps to install an option card on the three-slot side:

1. Remove the retaining screw securing the option slot cover to the computer, as shown below. (Keep the screw to secure the option card to the computer.)
2. Slide out the slot cover and set it aside. (Store it in a safe place in case you remove the option card later.)
3. Hold the card along the top corners and guide it into the slot, as shown below. (If you are installing a full-length card insert the front edge of the card into the corresponding guide inside the computer's front panel.)



Once the connectors reach the slot, push the card in firmly (but carefully) to insert it fully. You should feel the card fit into place. If it does not go in smoothly, do not force it; pull the card all the way out and try again.

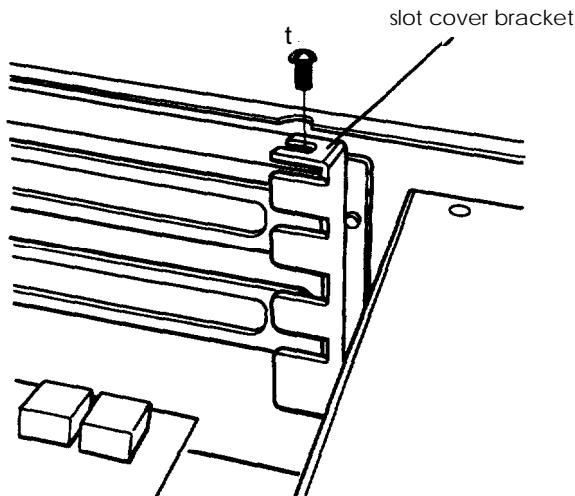
4. Secure the end of the card to the computer with the retaining screw.

### ***Installing a Card in the Slimline Computer (2-slot Side)***

The option card **connector** board in the slimline computer has two slots on one side and three slots on the other side.

Follow these steps to install an option card on the two-slot side:

1. Remove the retaining screw securing the slot cover bracket. Remove the bracket by lifting it straight up and out of the small metal holder at the bottom.



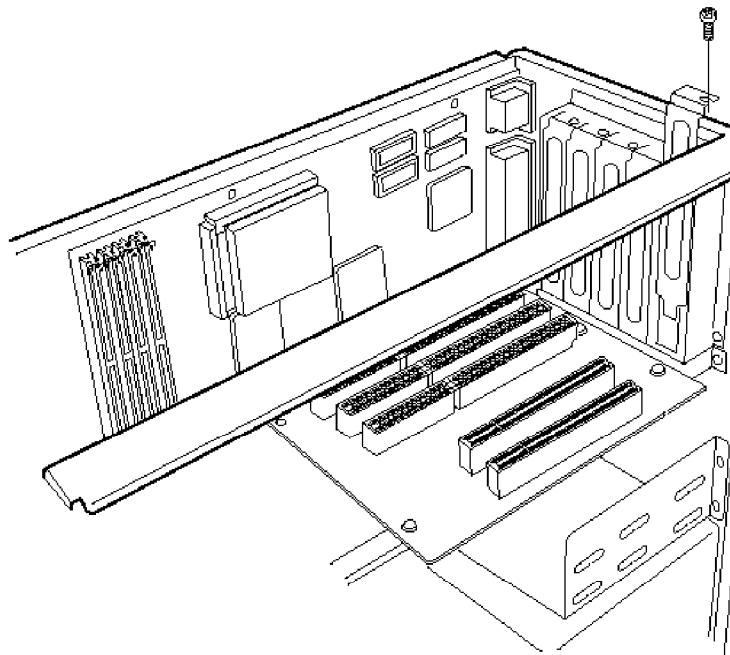
2. Remove the slot cover for the slot you are going to use.

3. Hold the card along the top corners and guide it into the slot. Once the connectors reach the slot, push the card in firmly (but carefully). You should feel the card fit into place. If it does not go in smoothly, do not force it; pull the card all the way out and try again.
4. Replace the slot cover bracket by inserting it into the small metal holder below the option slots; then replace its retaining screw.
5. Replace the computer's cover as described under "Replacing the Cover." Then see "Post-installation Procedures" for instructions on configuring your computer with your new option card.

## ***Installing a Card in the Tower Computer***

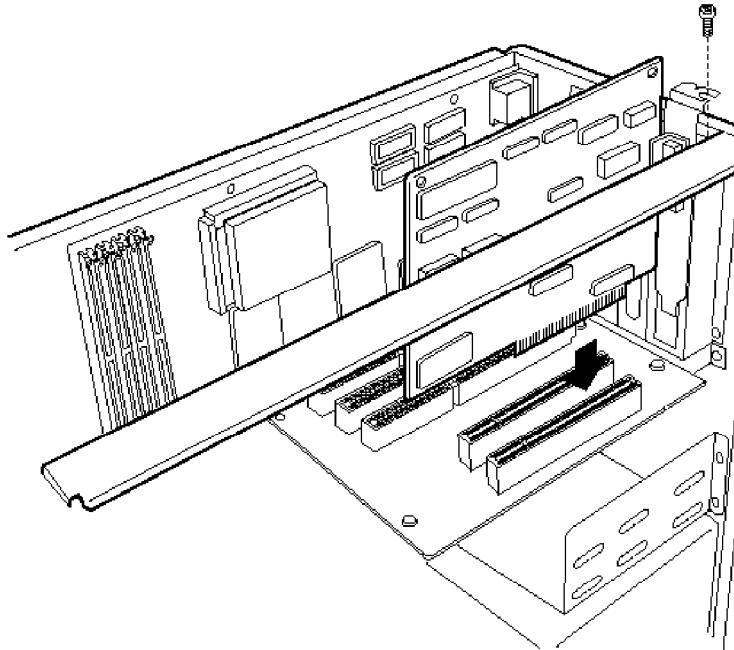
Follow these steps to install an option card in the tower computer. Although the illustration shows a PCI card, you can use the same instructions for installing an ISA card.

1. Remove the retaining screw securing the option slot cover to the computer, as shown below. (Keep the screw to secure the option card to the computer.)



2. Slide out the slot cover for the slot you are going to use and set it aside. (Store it in a safe place in case you remove the option card later.)

3. Hold the card along the top corners and guide it into the slot (If you are installing a full-length card, insert the front edge of the card into the corresponding guide inside the computer's front panel.)



Once the connectors reach the slot, push the card in firmly but carefully. You should feel the card fit into place. If it does not go in smoothly, do not force it; pull the card all the way out and try again.

4. Secure the end of the card to the computer with the retaining screw.
5. Replace the computer's cover as described under "Replacing the Cover." Then see "Post-installation Procedures" for instructions on configuring your computer with your new option card.

## ***Removing an Option Card***

You may need to remove an option card to access components on the main system board or if you no longer need it. Refer to the illustrations under “Installing an Option Card” for your computer type as you follow these steps:

1. If you are removing a card from the tower computer or from the three-slot side on the slimline computer, first remove the retaining screw securing the option card to the computer. Then pull the card straight out of the slot.
2. If you are removing a card from the two-slot side on the slimline computer, first remove the slot cover bracket. Then pull the card straight out of the slot.
3. If you are not installing another option card, replace the option slot cover, the slot cover bracket (if necessary), and retaining screw.
4. Replace the computer’s cover as described under “Replacing the Cover.” Then see “Post-installation Procedures” for instructions on configuring your computer without your option card.

## ***Adding Video Memory***

Your computer comes with 1MB of video memory. You can increase your video memory to 2MB by installing two 512KB, 40-pin SOJ flat pack video DRAM chips. (You cannot increase your video memory by installing just one chip.) Additional video memory is useful for running graphics-intensive applications or for supporting high resolutions with many colors.

Note that your video memory sockets may not look exactly like the ones in the illustration. If you're not sure how to install video memory chips, contact the EPSON Connection or your Authorized EPSON Servicer and ask for assistance.

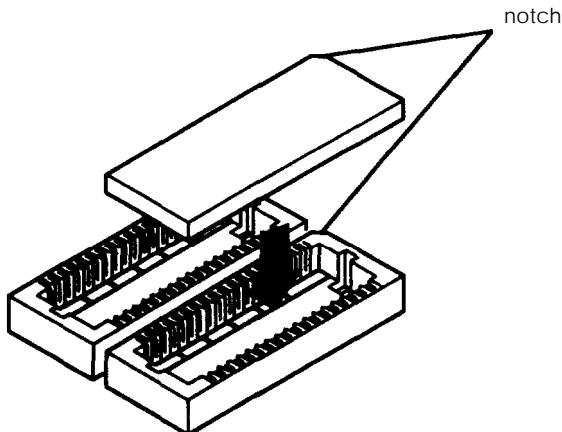
Follow these steps to install video memory chips:

1. Locate the video memory chip sockets on the left side of the main system board, shown under "Locating the Internal Components."
2. If there is an option card in your way, remove it. See 'Removing an Option Card' for instructions.

**Caution**

To avoid generating static electricity and damaging the memory chips, ground yourself by touching the metal surface on the inside of the computer's back panel. Then remain as stationary as possible while you install them.

3. Position the chip over the socket and align the notch in the chip's corner with the notch in the corner of the socket, as shown below.



4. Gently press the chip into the socket; then push down firmly on both ends to make sure it is well-seated.
5. Repeat steps 3 and 4 to install the other chip
6. Replace any option cards you removed; see “Installing an Option Card” for instructions.
7. Replace the computer’s cover as described under “Replacing the Cover. “Then see “Post-installation Procedures” for instructions on configuring your computer with the increased video memory.

---

## ***Installing External Cache***

You can install 128KB, 256KB, or 512KB of external cache with 32K x 8, 64K x 8, or 128K x 8 15ns or 20ns, SRAM DIP chips and one 32K x 8 15ns or 20ns, tag chip. Your computer may already have cache installed.

You must install cache in one of the configurations in the table below (each bank contains four cache memory sockets).

### *Cache memory configurations*

BANK 0 U23,24,25,26	BANK 1 U27,35,36,37	Tag S RAM U30	Total cache
32K x 8, 28-pin	None	32K x 8, 28-pin	128KB
32K x 8, 28-pin	32K x 8, 28-pin	32K x 8, 28-pin	256KB
64K x 8, 28-pin	64K x 8, 28-pin	32K x 8, 28-pin	512KB
128K x 8, 32-pin	None	32K x 8, 28-pin	512KB

Note that your cache memory sockets may not look exactly like the ones in the illustration. If you're not sure how to install cache memory chips, contact the EPSON Connection or your Authorized EPSON Servicer and ask for assistance.

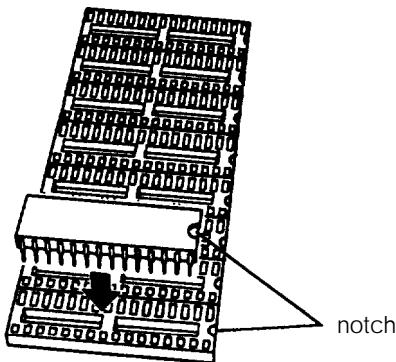
Follow these steps to install the external cache (if you have a tower computer, start with step 2):

1. If you have a slimline computer, you need to remove the drive mounting bracket to access the cache memory sockets. See "Removing the Drive Mounting Bracket" in Chapter 5 for instructions.
2. Locate the external cache memory sockets as shown under "Locating System Board Components."

#### **Caution**

To avoid generating static electricity and damaging the cache chips, ground yourself by touching the metal surface on the inside of the computer's back panel. Then remain as stationary as possible while you install them.

3. Inspect each cache memory chip; the pins should point inward at slightly less than a 90° angle. If any of the pins are bent or crooked straighten them gently with your fingers or with small tweezers to align them with the other pins. Be careful when you do this; the pins are fragile and can break off easily.
4. Position one of the cache chips over the first socket as shown below, aligning the pins on the chip with the holes in the socket. Align the small notch on the end of the chip with the corresponding notch on the socket.



5. Gently press the chip halfway into the socket (to make sure it is correctly aligned). If the chip goes in at an angle, remove it and try again.
6. When the chip is properly positioned, push down firmly on both ends of the chip to make sure it is well-seated.
7. Repeat steps 4 through 6 for each of the remaining chips.
8. Now install the tag SRAM chip in socket U30, next to the SIMM sockets, as described in steps 4 through 6 of this procedure. See “Locating System Board Components” to locate the tag SRAM socket on the main system board.

9. Change jumpers JP41,42,43,46,47, and 48 as described under “Changing the Jumper Settings” to match the cache configuration you have installed.
10. If you have a slimline computer, replace the drive mounting bracket as described under “Replacing the Bracket in the Computer” in Chapter 5.
11. Replace the computer’s cover as described under “Replacing the Cover.” Then see “Post-installation Procedures” for instructions on configuring your computer with your new cache memory configuration.

## ***Upgrading the Processor***

You can upgrade your processor with a more powerful one to improve system performance; see Appendix A for a list of compatible processors.

If you’re not sure how to install a processor, contact the EPSON Connection or your Authorized EPSON Servicer and ask for assistance.

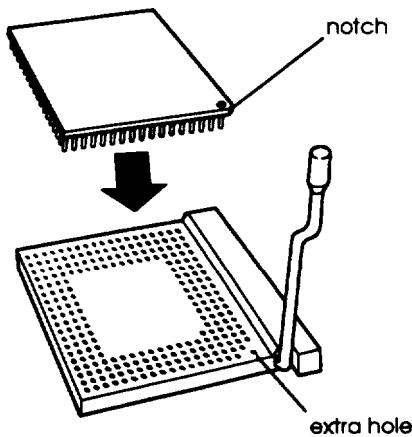
Follow these steps to replace a processor:

1. Use the illustration under “Locating the Internal Components” to locate the processor on the system board. The processor is installed in a ZIF (Zero Insertion Force) socket.

### **Caution**

Make sure you ground yourself by touching the metal surface on the inside of the computer’s back panel before you touch the processor. Then remain as stationary as possible while you install it. Do not touch the pins on the processor; handle it only by the edges.

2. If there are any option cards in your way, remove them. See "Removing an Option Card" for instructions.
3. To open the socket, locate the handle at the base of the socket. (The handle rests under a plastic tab.) Press the handle down and away from the tab; then lift it upright to release the chip from the socket. The illustration under step 6 shows this handle in the released position.
4. Gently pull the processor straight up and set it aside. (Store the chip in the packaging included with your new processor, in case you need to reinstall it later.)
5. Remove the replacement processor from its package and inspect the pins. If they are bent, do not install the processor chip. Contact your vendor for a new one.
6. Position the processor over the socket, aligning the notched edge with the extra hole on the socket, as shown below.



**caution**

If you install the processor in the wrong orientation, you may damage it and void your warranty.

7. Make sure the pins in the processor are directly over the holes in the socket. Then gently push the processor straight into the socket, pressing evenly on all sides.

If you are installing a 486 processor rather than an Intel Pentium OverDrive processor, you'll see an extra row of holes around the outside of the socket.

8. Secure the processor by pressing the ZIF handle back to the closed position.
9. Change the settings of the jumpers so that they are correct for the type of processor you installed. (Refer to the "CPU type jumper settings" table.) You may also need to change the setting of jumper JP6 to match the processor clock speed.

If you installed a processor with a different voltage (check the table under "Processor Upgrades" in Appendix A), you need to change the settings of jumper JP1 on the voltage regulator. See the tables under "Changing the Jumper Settings" for information on all processor jumper settings.

10. If you are upgrading to a DX DX2, DX4, or Pentium OverDrive processor, you must also install a heat sink over the processor. Follow the instructions included with the heat sink.
11. Replace any option cards you removed; see "Installing an Option Card" for instructions.
12. Replace the computer's cover as described under "Replacing the Cover." Then see "Post-installation Procedures" for instructions on configuring your computer with your new processor.

## ***Post-installation Procedures***

After you install or remove options such as memory modules or option cards, you must run SETUP to update the computer's configuration. If you are using Windows 95, you need to turn on the Reset Configuration **Data** option. See "Starting the SETUP Program" and "Using the Advanced System Setup Options" in Chapter 2 for instructions. Additionally, you may need to add some commands to your configuration files. See your operating system documentation and the manual that came with your optional equipment.

## *Chapter- 5*

# ***Installing and Removing Slimline Drives***

This chapter describes how to install and remove optional drives in your slimline computer.

### **↗ Tip**

If you have this manual online only, be sure to print out this chapter before performing any of the steps it describes.

You can use these instructions to install a variety of devices, such as hard disk drives, diskette drives, tape drives, CD-ROM drives, PCMCIA card readers, optical drives, or other mass storage devices.

### **Note**

This chapter describes installing and removing drives in the slim line computer; if you have a tower computer, see Chapter 6.

Although your drive may look different from the ones illustrated here, you should be able to install it the same way.

Follow the appropriate instructions in this chapter to do the following:

- Remove the diskette drive and mounting bracket
- Install a hard disk drive using the mounting bracket
- Remove a hard disk drive from the mounting bracket
- Install a drive in an externally accessible drive bay
- Remove a drive from an externally accessible drive bay.

Your slimline computer can hold up to four mass storage devices, including the diskette drive that came with your system. You can replace the existing hard disk drive in the internal mounting bracket below the diskette drive. In the externally accessible bays, you can install a CD-ROM drive or another type of drive.

To install or remove a drive, first follow the instructions under “Removing the Cover” in Chapter 4. Then remove any option cards that may be in your way. Once you have installed the drive, replace any option cards you removed. See “Installing an Option Card” in Chapter 4 for instructions.

Some of the steps in this chapter may not apply for the drive you are installing. See the documentation that came with your drive for more information.

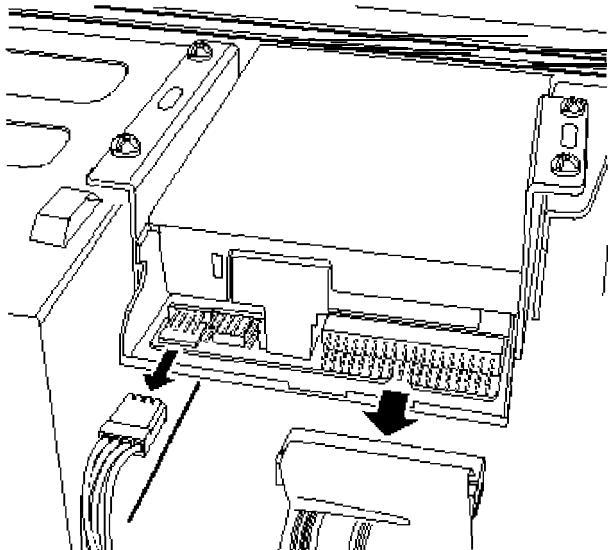
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## ***Removing the Drive Mounting Bracket***

Your computer has a 3.5-inch diskette drive and a hard disk drive installed in a mounting bracket. In order to install or remove any drives, you must first remove the drive mounting bracket.

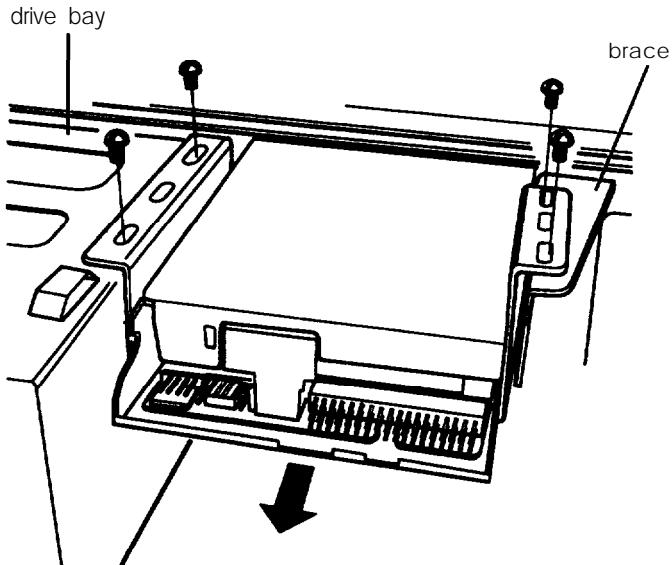
Follow these steps:

1. Remove the two cables from the diskette drive, as shown below. Grasp the connectors and pull them straight out so you do not bend the pins; do not pull on the cables.



2. Remove the two cables from the hard disk drive.

3. Remove the screws securing the bracket to the drive bay and brace. Save the screws for later use.



4. Slide the bracket away from the front of the computer and lift it out.

---

## ***Installing a Hard Disk Drive in the Mounting Bracket***

You can install a new hard disk drive below the diskette drive in the mounting bracket once you have removed the bracket and drive from the computer. In order to fit in this space, your hard disk drive must be 1 inch high by 3.5 inches wide. If you have a larger hard disk drive, you can install it in one of the other drive bays. (See "Installing a Drive in an External Drive Bay.")

This section includes steps for the following procedures:

- Setting the IDE device jumpers
- Installing a hard disk drive in the mounting bracket
- Replacing the mounting bracket in the computer
- Connecting the drive cables

## ***Setting the IDE Device Jumpers***

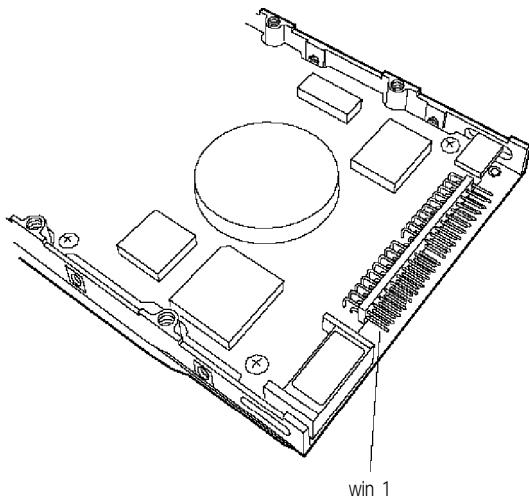
Before you install any IDE device, be sure to check its jumper settings. The jumpers indicate the master and slave configuration of devices connected to both of the IDE interfaces. If you have two hard disk drives, one must be configured as the master (which contains your operating system), and the other as the slave.

A table in the “Information for Qualified Hard Disk Drives” section of Appendix A lists the master and slave jumper settings for some high-capacity, IDE hard disk drives. If your drive is not listed or you need more information, see the documentation that came with your drive or contact the manufacturer.

If you are installing another type of IDE device, such as an IDE CD-ROM drive, check the documentation that came with the device for the master and slave jumper settings. You *must connect these devices to the secondary IDE interface, as described in this chapter. Use the primary interface to connect only IDE hard disk drives.*

## ***Installing the Hard Disk Drive***

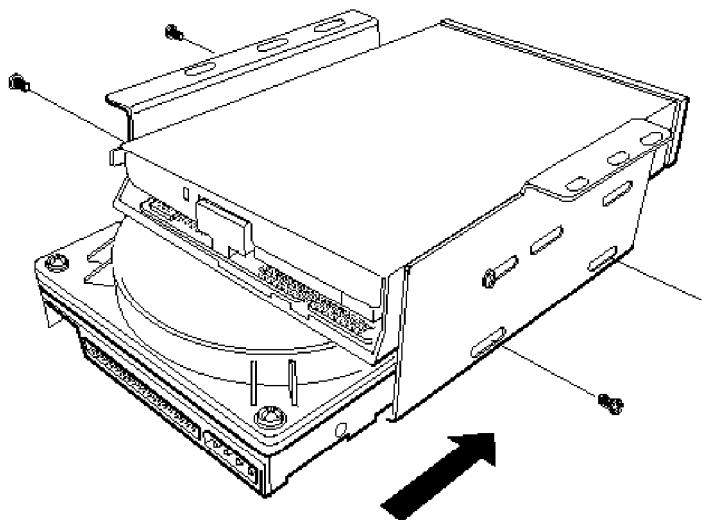
Before you install the hard disk drive, turn it over so you can see the circuit board, as shown below. Locate the side of the drive connector containing pin 1, indicated by a “1” or “2” printed on the board. You need to know the location of pin 1 when you connect the hard drive cable.



Follow these steps to install a hard disk drive in the mounting bracket:

1. With the drive components facing down, slide the drive into the bracket until the front of the drive is nearly flush with the edge of the bracket.

2. Align the holes in the drive with the oval-shaped holes in the bracket.



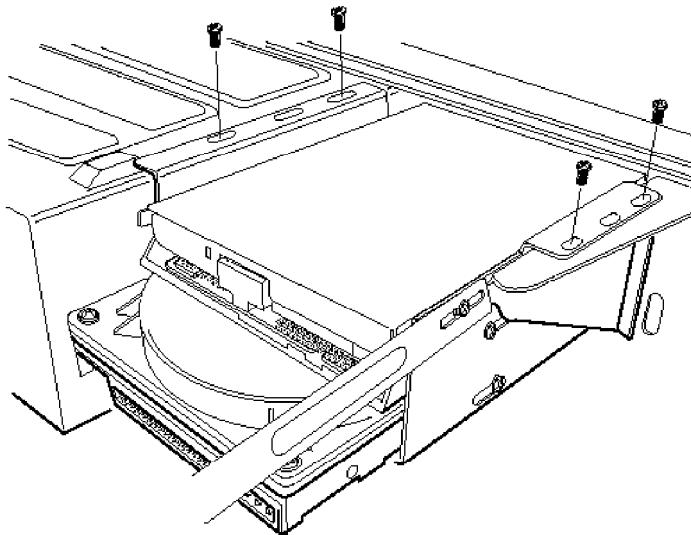
3. Secure the drive with two or four screws, depending on the location of the holes.

## ***Replacing the Bracket in the Computer***

Follow these steps to replace the bracket in your computer:

1. Lower the bracket into the mounting area and slide it forward, inserting the front of the diskette drive through the drive slot in the front panel of the computer.

2. Make sure the holes in the bracket are aligned with the holes in the drive bay and brace. Then secure the bracket with the screws you removed previously.



## ***Connecting the Drive Cables***

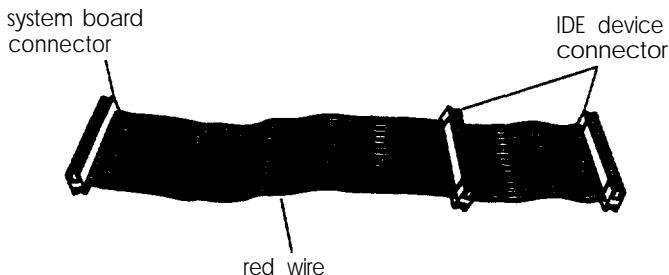
After you replace the bracket, you need to connect the cables for both the hard disk drive and the diskette drive. This section includes steps for the following procedures:

- Connecting the hard disk drive cables
- Reconnecting the cables to the diskette drive.

## *Connecting the hard disk drive cables*

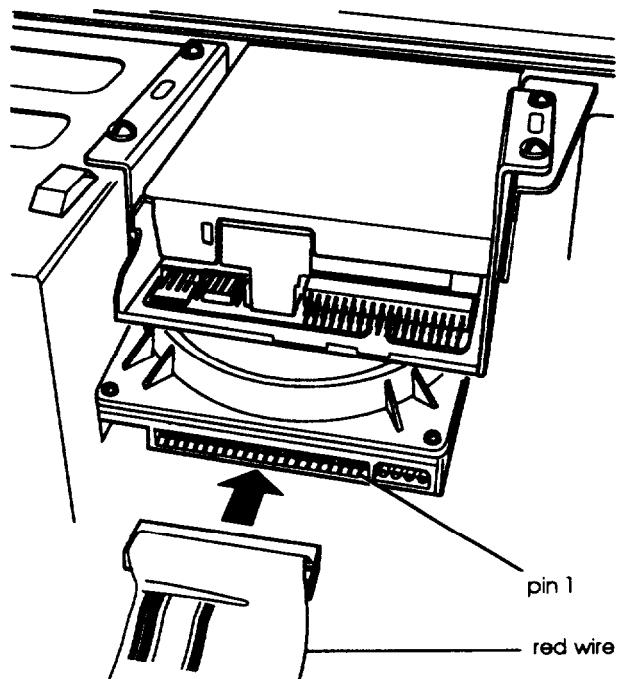
After you replace the bracket, you need to connect the cables to the hard disk drive. Follow these steps:

1. Locate one of the IDE device cables that are connected to the IDE interfaces on the system board. They are flat cables with a system board connector on one end and two IDE device connectors on the other end. A red wire runs down one side of the cable. (See “Locating System Board Components” in Chapter 4 to find the primary and secondary IDE interfaces on the system board.)



Use the primary IDE interface for your boot drive and your second hard disk drive; use the secondary IDE interface to connect IDE CD-ROM drives, other IDE devices, or your third and fourth drives. You cannot connect a CD-ROM drive and hard disk drive to the same interface.

2. Identify the IDE device connector on the IDE device cable that you will use.
3. Locate pin 1 on the drive connector. If you do not see it on the connector casing and you did not locate it before you replaced the drive bracket, you may have to remove the drive and turn it over to check the circuit board.
4. Position the connector on the cable so that the red wire aligns with pin 1 on the drive.

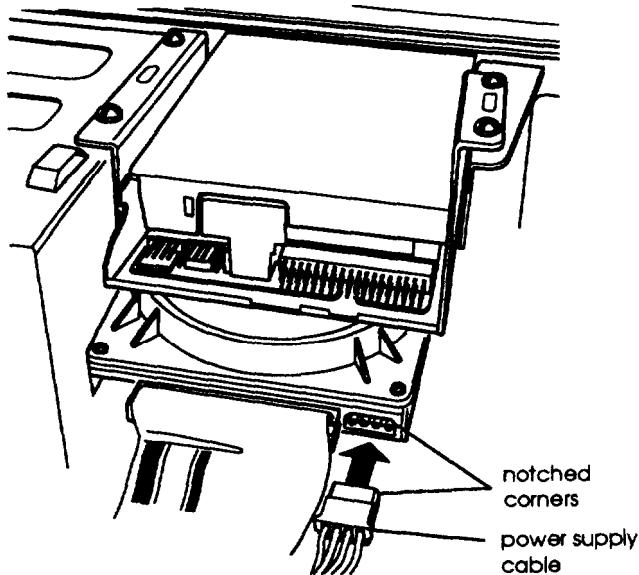


5. Make sure the holes in the cable connector fit over all the pins; then push in the connector.

**Caution**

If you do not correctly align the holes with the pins, you could severely damage your hard disk drive when you push in the connector.

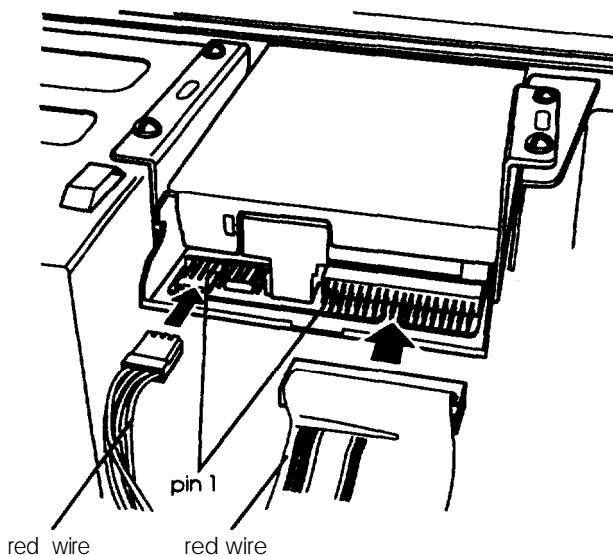
6. Locate one of the power supply cables that lead from the power supply. (They have multi-colored wires and a plastic connector on the end.)
7. Position the power supply cable connector so that its notched corners line up with the notched corners of the power supply connector on the hard disk drive.



8. Make sure the holes fit over all the pins and then push in the **connector**.

## ***Reconnecting the Cables to the Diskette Drive***

Refer to the illustration below while you follow these steps:



1. Locate the connector on the diskette drive ribbon cable.
2. Identify pin 1 on the drive and align the connector so that the red wire is at pin 1. Push in the connector.
3. Locate the power supply cable with the small connector.
4. Position the power supply cable connector so that the holes fit over all the pins and the red wire aligns with pin 1 on the drive's connector. Then push in the connector.
5. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## ***Removing a Hard Disk Drive From the Mounting Bracket***

You may need to remove a hard disk drive for service or for replacement.

### **Caution**

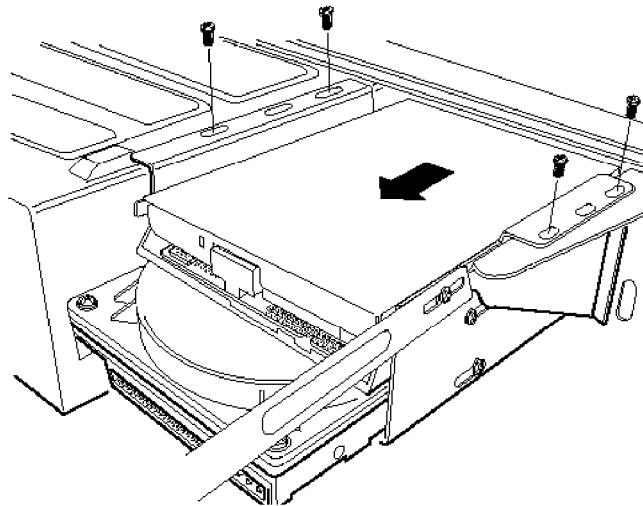
Before you remove a hard disk drive, make sure you have backup copies of all your files and programs. You can use backup software or the backup utility in your operating system. Refer to the online help files or software documentation for instructions.

If your system included a Recovery CD-ROM, it contains an image of your hard drive as it was configured at the factory. You can use this CD-ROM to restore the original files that came on the hard drive; you cannot restore any data files you have created.

Follow these steps to remove a hard disk drive from the bracket:

1. Disconnect the cables from the back of the hard disk drive and diskette drive in the bracket. Grasp the connectors and pull them straight out so you do not bend the pins; do not pull on the cables.
2. Remove the screws securing the bracket to the drive bay and brace.

3. Slide the bracket away from the mounting area and lift it out



4. Remove the screws securing the hard disk drive to the bracket and slide the drive out of the bracket.
5. Replace the bracket following the instructions under "Replacing the Bracket in the Computer."
6. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## ***Installing a Drive in an External Drive Bay***

Your system comes with two externally accessible drive bays. You can install any type of drive in these bays, including internal hard disk drives.

If you are installing a hard disk drive or another IDE device, be sure its jumper(s) are set correctly for your configuration. A table in the “Information for Qualified Hard Disk Drives” section of Appendix A lists the master and slave jumper settings for high-capacity, EPSON-qualified IDE hard disk drives. If your drive is not listed or you need more information, see the documentation that came with your drive or contact the manufacturer.

### ***Note***

You must connect IDE CD-ROM drives or other devices to the secondary IDE interface. Use the primary interface only for IDE hard disk drives. You cannot connect a CD-ROM drive and hard disk drive to the same interface.

Before you can install a drive in one of the external bays, you must remove the mounting bracket containing the diskette drive (and possibly a hard disk drive). Follow the instructions under “Removing the Drive Mounting Bracket.” (You can remove the bracket and drives without disconnecting the drive cables.)

This section includes steps for the following procedures:

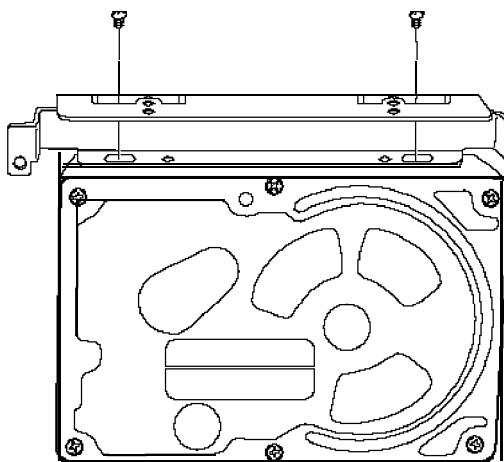
- Attaching mounting frames to the drive (if necessary)
- Installing the drive in the bay
- Connecting the drive cables.

## **Attaching Mounting Frames to the Drive**

If you are installing a 3.5-inch wide drive, you need to attach mounting frames to it so that the drive fits in a 5.25-inch wide bay. These frames usually come with your drive.

Follow these steps to attach mounting frames to a drive:

1. Locate the two mounting frames and four screws that came with the drive.
2. As shown below, place a mounting frame on one side of the drive and align it so that the oval holes in the frame are positioned over the holes in the drive. Then secure the mounting frame to the drive with the two screws.

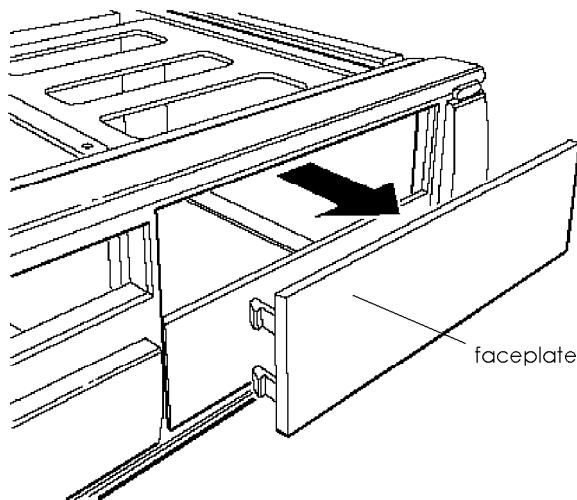


3. Repeat step 2 to attach a mounting frame to the other side of the drive.

## ***Installing the Drive***

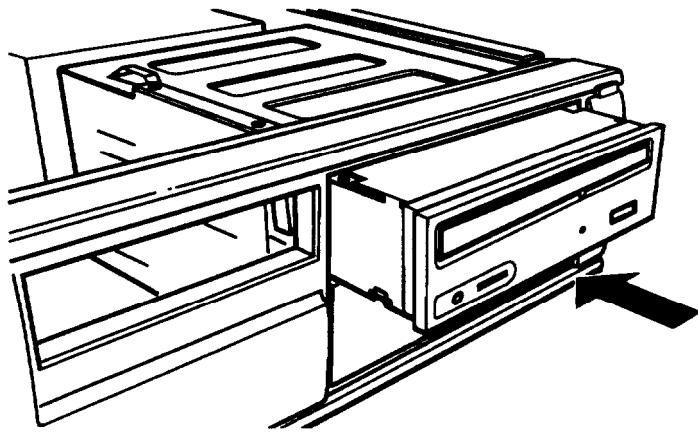
Follow these steps to install a drive in the upper or lower external drive bay:

1. Using a screwdriver, reach inside the back of the drive bay and insert the screwdriver into one of the holes in the metal plate covering the drive bay slot. Move the screwdriver up and down until the plate loosens; then grasp the plate with your hands and pull it out of the back of the drive bay. Discard the plate; you do not need to reinstall it.
2. Remove the plastic faceplate from the bay by pushing it out from the inside of the computer.

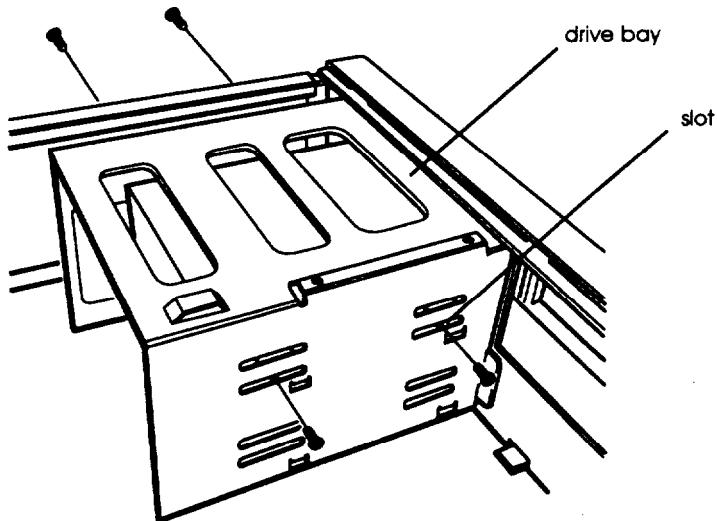


Keep the faceplate in a safe place in case you remove a drive later (or if you install a hard disk drive).

3. Slide the drive through the slot into the bay until it is flush with the front of the computer.



4. Align the slots at the side of the drive bay with the mounting holes in the drive or mounting frames. Then secure both sides of the drive to the bay using the retaining screws that came with the drive.



## **Connecting the Drive and Power Cables**

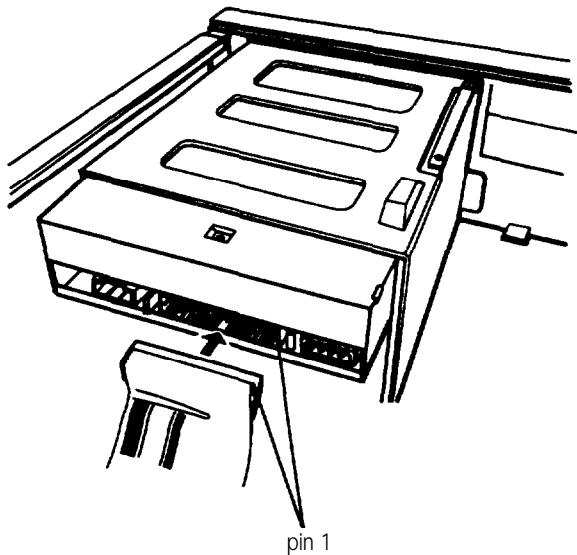
- If your IDE device cable is already connected to the IDE interface, follow the steps in this section to connect the cable to the drive.

**Note**

**Make sure you connect a CD-ROM drive to the secondary IDE interface; do not use the same cable for a hard disk drive and a CD-ROM drive.**

Follow these steps to connect the drive and power cables:

1. Locate the connector at the end of the ribbon cable.
2. Locate pin 1 on the drive connector next to the power connector.
3. Position the connector on the cable so that the red wire aligns with pin 1 on the drive.

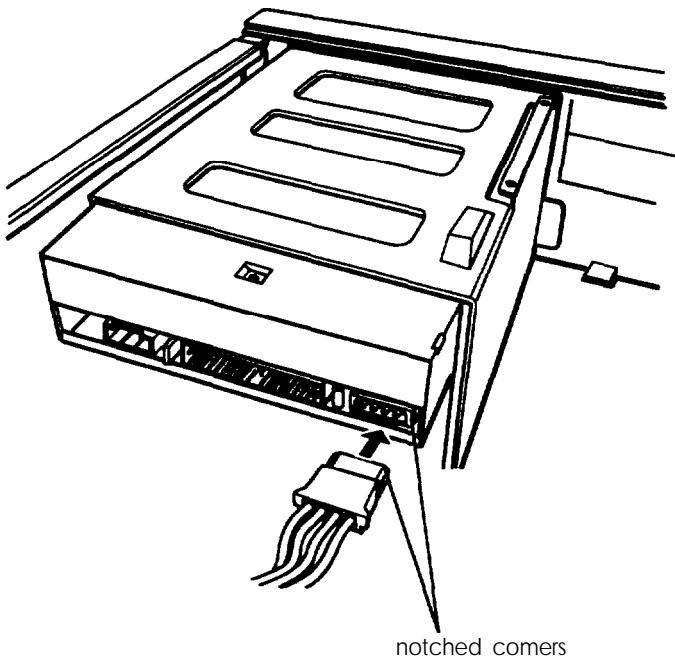


4. Make sure the holes in the cable connector fit over all the pins; then push in the connector.

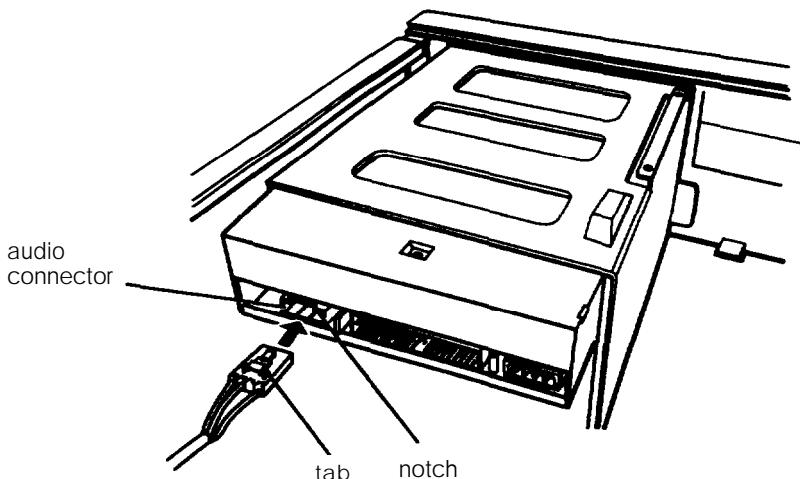
**Caution**

If you do not correctly align the holes with the pins, you could severely damage your hard disk drive when you push in the connector.

5. Locate one of the power supply cables that lead from the power supply. (They have multi-colored wires and a plastic connector on the end.)
6. Align the notched corners of the power supply cable connector with the notched corners of the drive's power connector (such as the one shown below). Make sure the holes fit over all the pins and then push in the connector.



7. If you are installing a CD-ROM drive, you need to connect the audio cable; it has small plastic connectors at either end. Follow the instructions that came with your sound card to connect the audio cable to the card. If you need to install a sound card first, follow the instructions under “Installing an Option Card” in Chapter 4.
8. Position the audio cable connector so that the tab faces up and aligns with the notch in the CD-ROM drive’s audio connector. Then push in the connector.



9. If you installed a hard disk drive in one of the external bays, replace the faceplate. Insert one side of the plate, then gently press on the other side until it snaps into place.
10. Replace the internal mounting bracket and the drives it contains. See “Replacing the Bracket in the Computer” for instructions.

11. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## ***Removing a Drive from an External Bay***

You may need to remove a drive for service or replacement.

### **Caution**

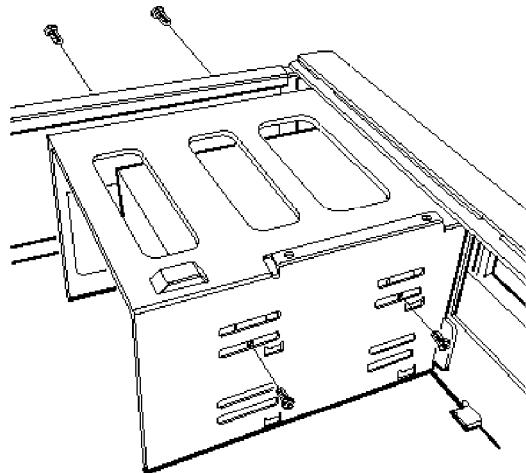
Before you remove a hard disk drive, make sure you have backup copies of all your files and programs. You can use backup software or the backup utility in your operating system. Refer to the online help files or software documentation for instructions.

If your system included a Recovery CD-ROM, it contains an image of your hard drive as it was configured at the factory. You can use this CD-ROM to restore the original files that came on the hard drive; you cannot restore any data files you have created.

To remove a drive from an external drive bay, follow these steps:

1. Remove the drive mounting bracket, following the instructions under "Removing the Drive Mounting Bracket." (You can remove the bracket and drives without disconnecting the drive cables.)
2. Disconnect all cables from the drive you are removing.

3. Remove the screws securing the drive on both sides.



4. Reach behind the drive and gently push it out through the front of the bay; then pull it out of the slot.
5. Once you have removed the drive, replace the faceplate by inserting one side of the plate, then gently pressing on the other side until it snaps into place.
6. If you removed the only IDE device connected to the interface the device used, you may want to disconnect the device cable from the main system board and remove it from the computer.
7. Replace the drive mounting bracket. See "Replacing the Bracket in the Computer" for instructions.
8. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## ***Installing and Removing Tower Drives***

This chapter describes how to install and remove optional drives in your tower computer.

### **↗ Tip**

If you have this manual online only, be sure to print out this chapter before performing any of the steps it describes.

You can use these instructions to install a variety of devices, including hard disk drives, diskette drives, tape drives, CD-ROM drives, PCMCIA card readers, optical drives, or other mass storage devices.

#### Note

This chapter describes installing and removing drives in the tower computer; if you have a slimline computer, see Chapter 5.

Although your drive may look different from the ones illustrated here, you should be able to install it the same way.

Follow the appropriate instructions in this chapter to do the following:

- Set the IDE device jumpers
- Install a drive in the front internal drive bay
- Remove a drive from the front internal drive bay
- Install a drive in an externally accessible drive bay
- Remove a drive from an externally accessible drive bay

- Install a drive in the rear internal drive bracket
- Remove a drive from the rear internal drive bracket.

Also consult the documentation that came with your drive for additional information.

Your tower computer can hold up to seven mass storage devices, as described in the table below.

Drive bay	Drive type	Drive size
Four externally accessible bays	Diskette, CD-ROM, tape, or optical drives, or a PCMCIA card reader	Two 5.25-inch, half-height drives or one 5.25-inch, full-height drive and two 3.5-inch, half-height drives
One front internal bay	Hard disk drive only	One 3.5-inch, half-height or third-height drive
Two rear internal bays	Hard disk drive only	Two 3.5-inch, half-height or third-height drives or one 3.5-inch, full-height drive

To install or remove a drive, first remove the computer's cover as described under "Removing the Cover" in Chapter 4. Then remove any option cards that may be in your way. Once you finish installing or removing drives, replace any option cards you removed. See "Installing an Option Card" in Chapter 4 for instructions.

## **Setting the Jumpers and Locating Pin 1**

Before you install any IDE devices, you need to check the settings of the device's jumpers and locate pin 1 on the drive connector.

The jumpers indicate the master and slave configuration of devices connected to both of the IDE interfaces. A table in the "Information for Qualified Hard Disk Drives" section of Appendix A lists the master and slave jumper settings for EPSON-qualified, high-capacity, IDE hard disk drives. If your hard disk drive is not listed in that table, check the documentation that came with it or call the manufacturer for the jumper settings.

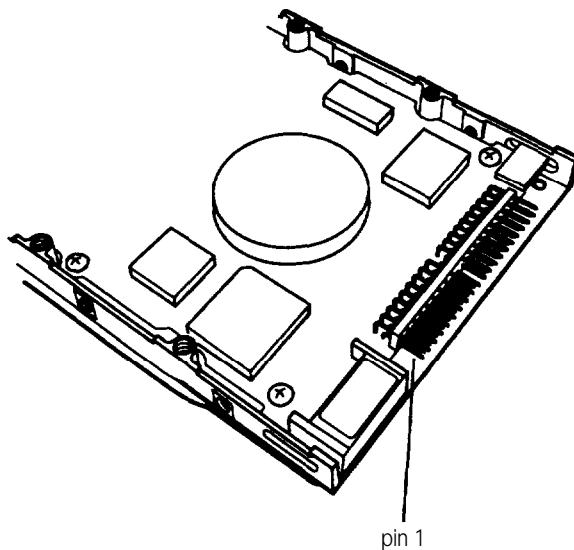
### **Note**

You may also want to look at the information that came with your drive and make a note of the drive parameters (such as cylinders, heads, etc.), in case the auto-sensing feature in SETUP cannot detect these parameters when you configure the drive.

If you are installing another type of IDE device, such as an IDE CD-ROM drive, check the documentation that came with the device for the master and slave jumper settings. You *must connect these devices to the secondary IDE interface, as described in this chapter. Use the primary interface to connect only IDE hard disk drives.*

**Note**

Before you install the hard disk drive, turn it over so you can see the circuit board, as shown below. Locate the side of the drive connector containing pin 1, indicated by a “1” or “2” printed on the connector or the board. You need to know the location of pin 1 when you connect the hard drive cable.



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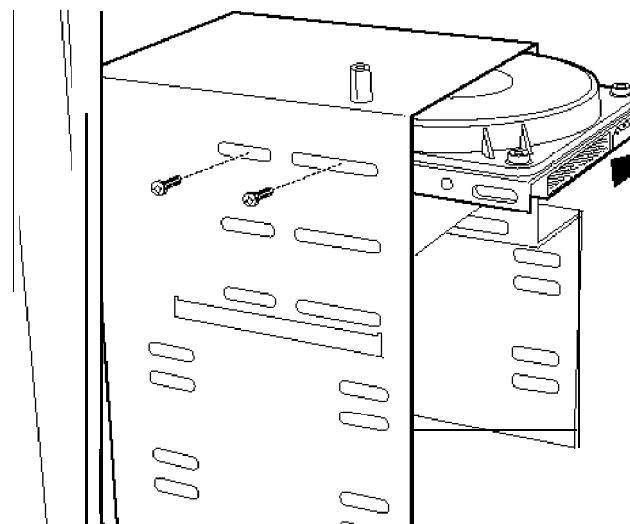
## ***Installing a Drive in the Front Internal Drive Bay***

You can install a half-height, 3.5-inch drive in the front internal drive bays.

## ***Installing the Internal Drive***

Follow these steps to install a drive in the front internal bay:

1. Position the drive so its drive and power connectors face the back of the computer and its circuit board is on the bottom.
2. Slide the drive into the front internal drive bay as shown below. Align the holes in both sides of the drive with the slots in the drive bay. Then secure the drive to the bay with the four screws that came with it.

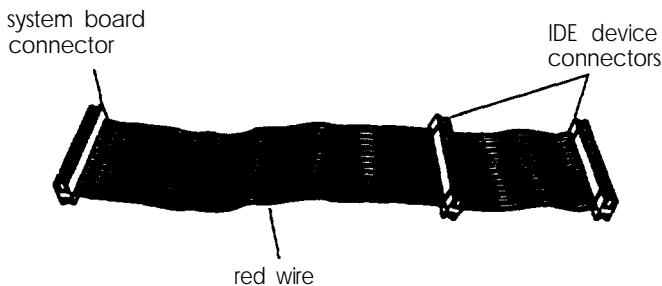


You are now ready to connect the cables to the drive using the instructions in the next section.

## **Connecting the Cables to the Front Internal Drive**

Follow these steps to connect the IDE device and power cables to the front internal drive:

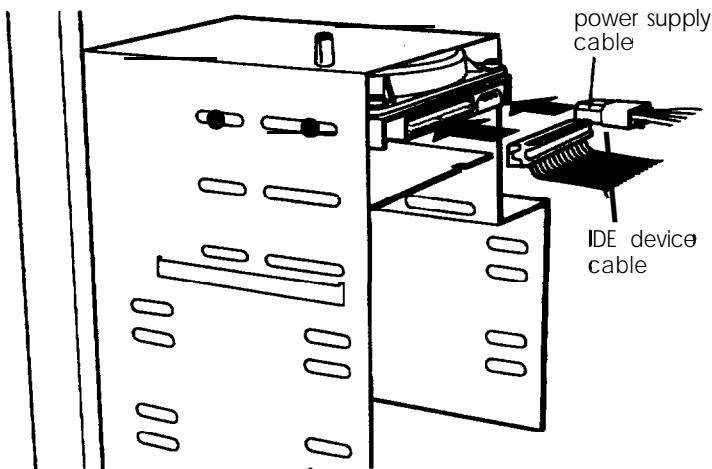
1. Locate the IDE device cables that are connected to the IDE interface on the system board. They are flat cables with a system board connector at one end and two IDE device connectors at the other end. The cable has a red wire on one side. (If necessary, see “Locating System Board Components” in Chapter 4 to find the primary and secondary IDE interfaces on the system board.)



Use the primary IDE interface for your boot drive and your second hard disk drive; use the secondary IDE interface to connect IDE CD-ROM drives, other IDE devices, or your third and fourth drives. You cannot connect a CD-ROM drive and hard disk drive to the same interface.

2. Identify the IDE device connector you will use on the IDE device cable.
3. Locate pin 1 on the drive connector. The number 1 or 2 may be printed on the drive's connector or circuit board to identify the side of the connector containing pin 1.

4. Position the connector on the cable so the red wire aligns with pin 1 on the drive. Make sure the holes in the cable connector fit over all the pins; then push in the connector.



5. Locate one of the power supply cables that lead from the power supply. (They have multi-colored wires and a plastic connector on the end.) Align the notched corners of the power supply connector and the drive's power connector; **then** push in the connector, as shown above.

**Note**

Your system includes five power supply cables; three with full-size connectors and two with smaller connectors. If you need more than these five connectors, you can purchase Y-adapters for power supply cables at most computer accessory stores. A Y-adapter allows you to use one connector for two devices.

6. If you have finished installing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

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## ***Removing a Drive From the Front Internal Drive Bay***

You may need to remove a hard disk drive for service or for replacement.

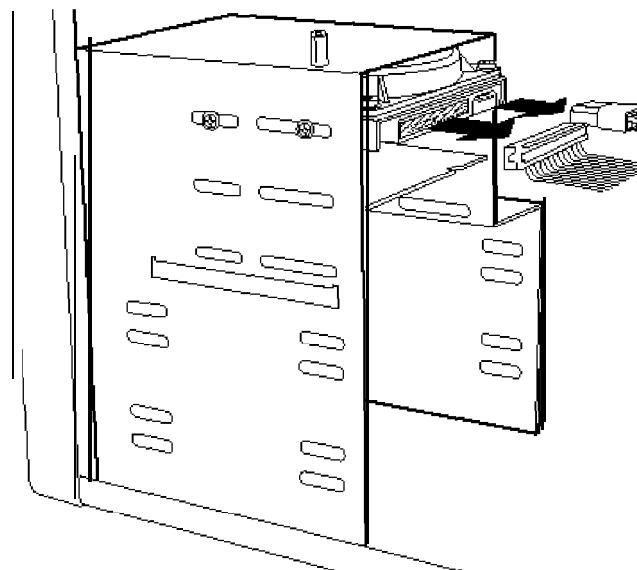
**Caution**

Before you remove a hard disk drive, make sure you have backup copies of all your files and programs. You can use backup software or the backup utility in your operating system. Refer to the online help files or software documentation for instructions.

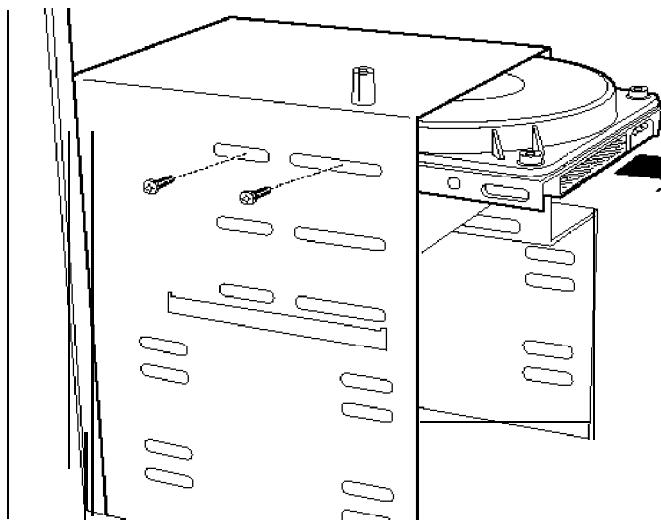
If your system included a Recovery CD-ROM, it contains an image of your hard drive as it was configured at the factory. You can use this CD-ROM to restore the original files that came on the hard drive; you cannot restore any data files you have created.

Follow these steps to remove a drive from the front internal drive bay:

1. Remove the drive and power cables from the back of the drive.



2. Remove the four screws securing the drive to the drive bay. There are two screws on each side of the drive.

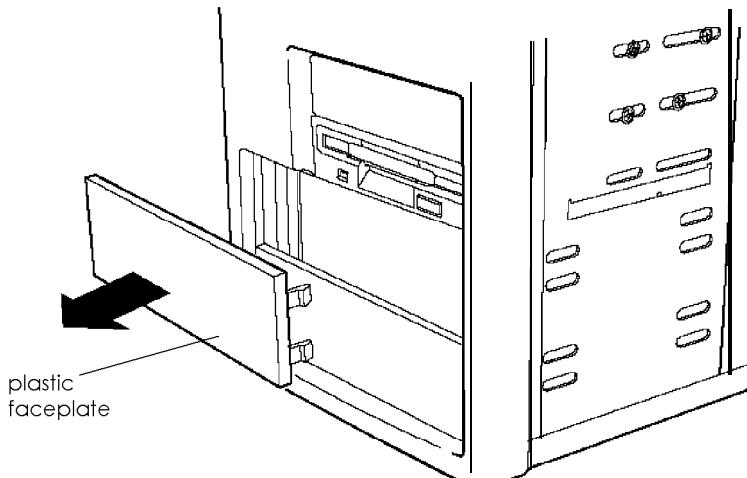


3. Slide the drive out the back of the bay.
4. If you removed the only IDE device connected to the interface the device used, you may want to disconnect the device cable from the interface on the main system board and remove it from the computer.
5. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## ***Installing a Drive in an External Bay***

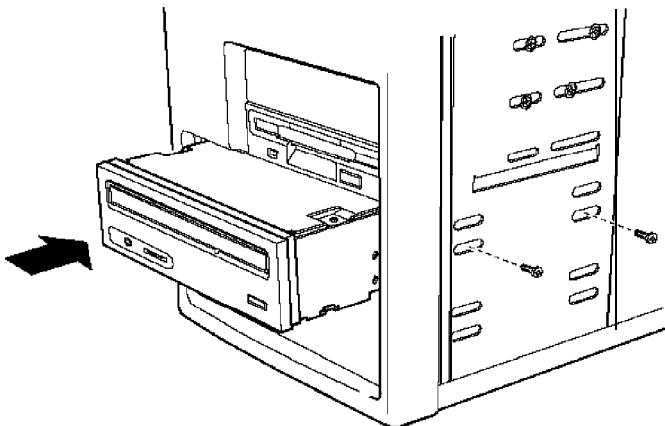
Follow these steps to install a drive in an externally accessible drive bay:

1. Reach inside the back of the drive bay and insert the screwdriver into one of the holes in the metal plate covering the drive bay slot. Move the screwdriver up and down until the plate loosens; then grasp the plate with your hands and pull it out of the back of the drive bay. Discard the plate; you do not need to reinstall it.
2. Remove the plastic faceplate from the drive bay by pushing it out from the inside of the computer. Keep the faceplate in a safe place in case you remove a drive later (or you are installing a hard disk drive).



3. Position the drive so the connectors face the back of the computer.

4. Slide the drive into the front of the bay and secure it to the bay using the four screws that came with the drive.



5. Connect the appropriate drive ribbon cable to the drive.

If you are installing an IDE device, follow the instructions under "Connecting the Cables to the Front Internal Drive."

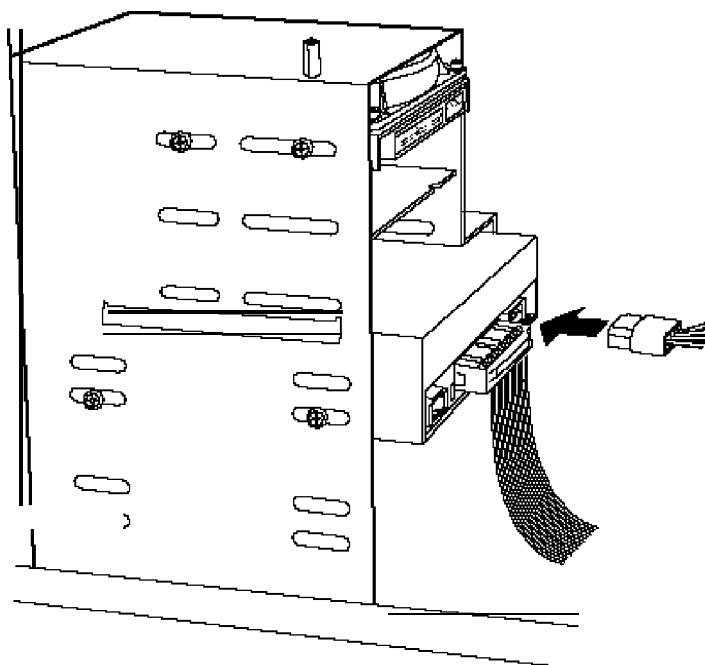
If you are installing a diskette or tape drive, use one of the connectors on the diskette drive ribbon cable. If your drive has a connector containing pins (a header connector), be sure to align pin 1 of the drive connector with the side of the cable containing the red wire. If your drive has a card-edge connector (with gold contacts on each side of a flat plastic connector), align the key-way in the cable connector with the gap in the drive connector.

If you are installing another type of drive, see the documentation that came with it for instructions on connecting its drive cable.

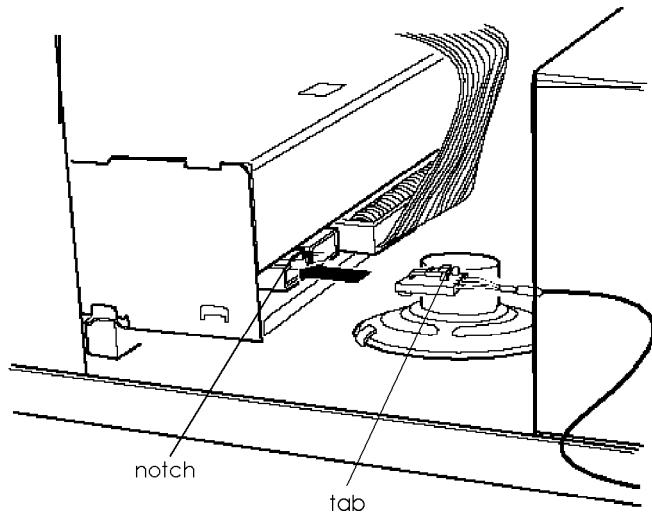
6. Now locate one of the power supply cables that lead from the power supply. (They have multi-colored wires and a plastic connector on the end.) Align the notched corners of the cable's connector and the drive's power connector; then push in the cable connector.

**Note**

Your system includes five power supply cables; three with full-size connectors and two with smaller connectors. If you need more than these five connectors, you can purchase Y-adapters for power supply cables at most computer accessory stores. A Y-adapter allows you to use one connector for two devices.



7. If you are installing a CD-ROM drive, you will need to connect the audio cable; it has small plastic connectors at either end. Follow the instructions that came with your sound card to connect the audio cable to the card. If you need to install a sound card, follow the instructions under "Installing an Option Card" in Chapter 4.

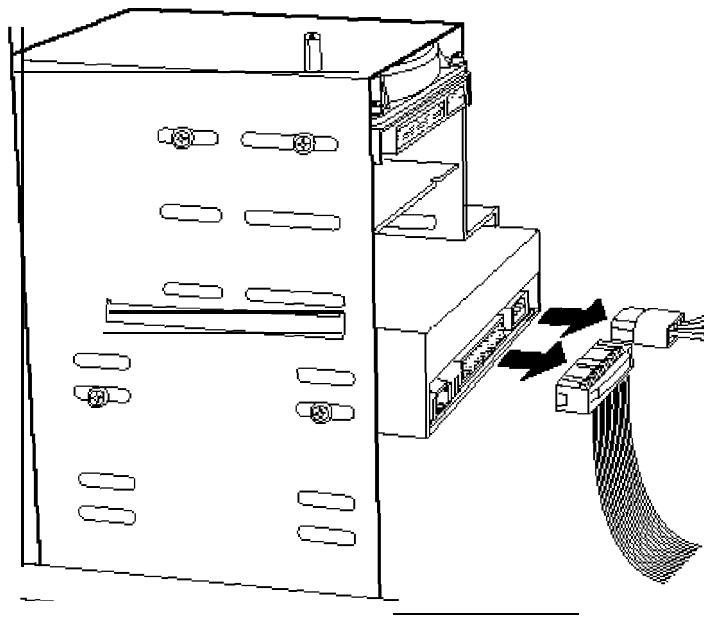


8. Position the audio cable connector so that the tab faces up and aligns with the notch in the CD-ROM drive's audio connector. Then push in the connector.
9. If you installed a hard disk drive, replace the plastic faceplate for the bay you used. Insert one side of the plate, then gently press on the other side until it snaps into place.
10. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Options" in Chapter 2 for instructions on defining your new drive configuration.

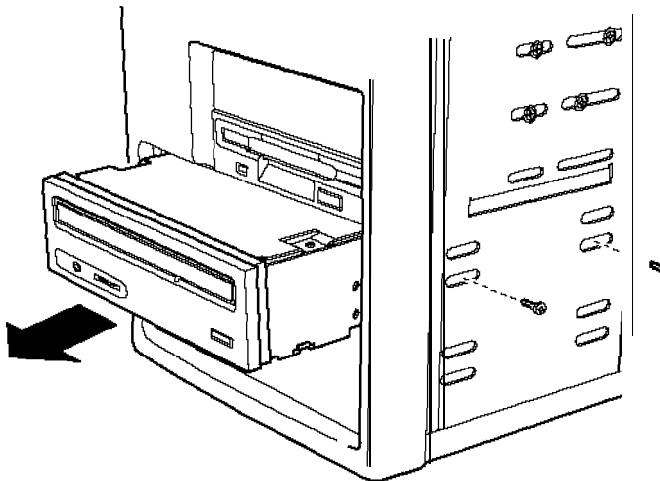
## ***Removing a Drive From an External Bay***

Follow these steps to remove a drive from an externally accessible drive bay:

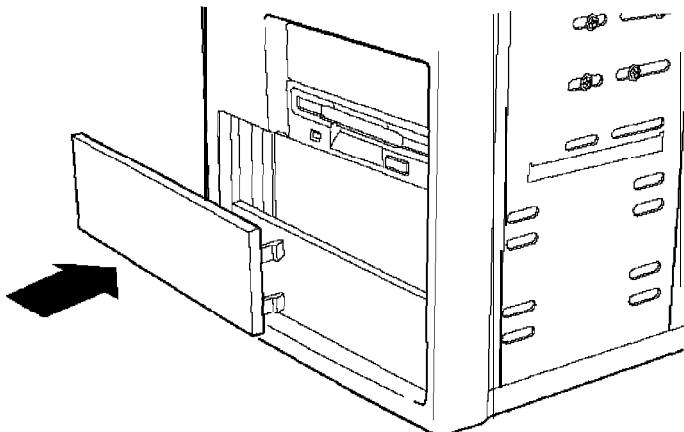
1. Disconnect the drive and power cables from the back of the drive you will remove. Also remove the audio cable if you are removing a CD-ROM drive.



2. Remove the four screws (two on each side) securing the drive to the drive bay. Then slide the drive out through the front of the bay



3. If you are not installing an externally accessible drive in the open drive bay, you need to install a faceplate for that bay. Push the faceplate into the open bay until the tabs on the plate click into place.

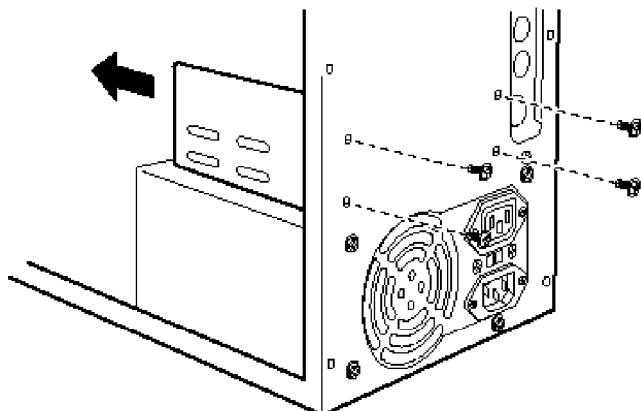


4. If you removed the only IDE device connected to the interface the device used, you may want to disconnect the device cable from the interface on the main system board and remove it from the computer.
5. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

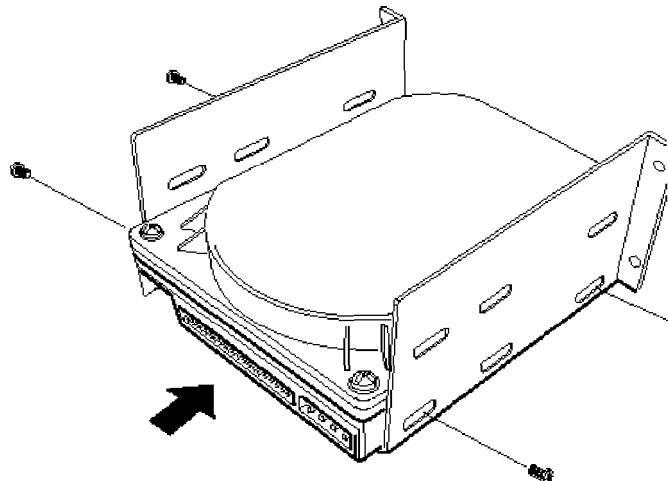
## ***Installing a Drive in the Rear Internal Bracket***

Your computer has a hard disk drive installed in the rear internal drive bracket. Follow these steps to install a second drive in this bracket:

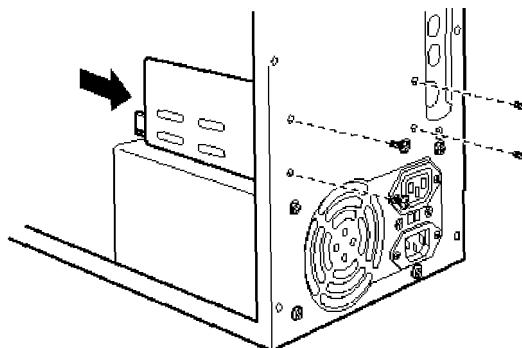
1. Remove the drive and power cables from the back of any drive already installed in the rear internal drive bracket.
2. Remove the four screws securing the rear internal drive bracket to the computer's back panel and slide it out of the computer. Make sure you save the screws.



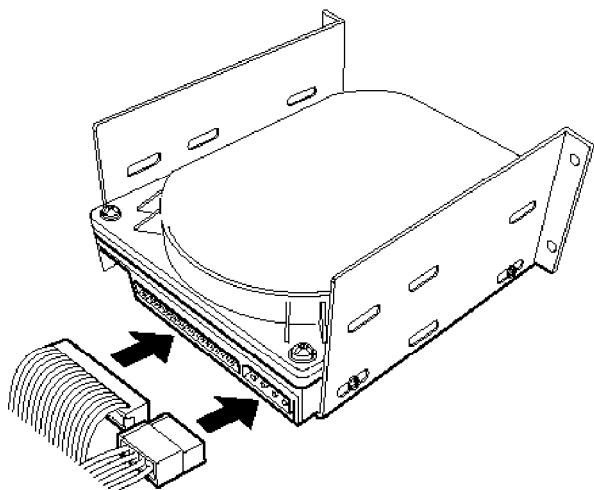
3. Place the rear internal drive bracket on your work surface as shown in the illustration below.
4. Position the drive so that its drive and power connectors face the end of the bracket shown below. Then slide the drive into the appropriate bay in the bracket and secure it with the four screws that came with the drive.



5. Place the bracket as shown below and secure it to the back panel with the four screws you removed earlier.



6. To connect the drive ribbon cables to the drives in the rear internal bracket, first locate pin 1 on each drive's connector. The number 1 or 2 may be printed on the drive's connector or circuit board to identify the side of the connector containing pin 1.
7. Hold the cable connector so the red wire aligns with pin 1 on the drive. Make sure the holes in the connector fit over all the pins; then push in the connector.



8. Locate a power supply cable for each drive installed in the rear internal bracket. These cables lead from the power supply and have multi-colored wires with a plastic connector on the end. Align the notched corners of the power supply connector with the drive's power connector; then push in the connector.

#### Note

Your system includes five power supply cables; three with full-size connectors and two with smaller connectors. If you need more than these five connectors, you can purchase Y-adapters for power supply cables at most computer accessory stores. A Y-adapter allows you to use one connector for two devices.

9. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

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## ***Removing a Drive From the Rear Internal Bracket***

You may need to remove a hard disk drive for service or replacement.

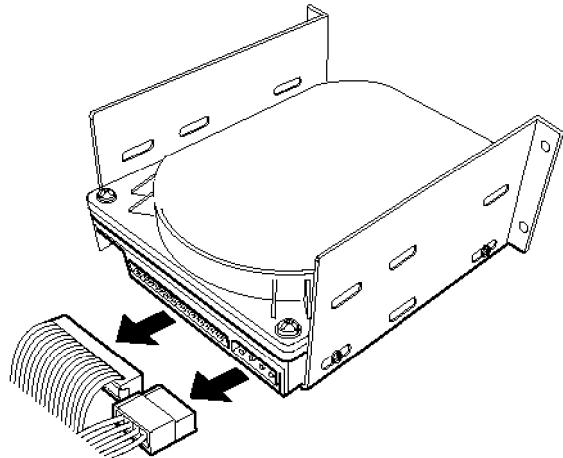
#### Caution

Before you remove a hard disk drive, make sure you have backup copies of all your files and programs. You can use backup software or the backup utility in your operating system. Refer to the online help files or software documentation for instructions.

If your system included a Recovery CD-ROM, it contains an image of your hard drive as it was configured at the factory. You can use this CD-ROM to restore the original files that came on the hard drive; you cannot restore any data files you have created.

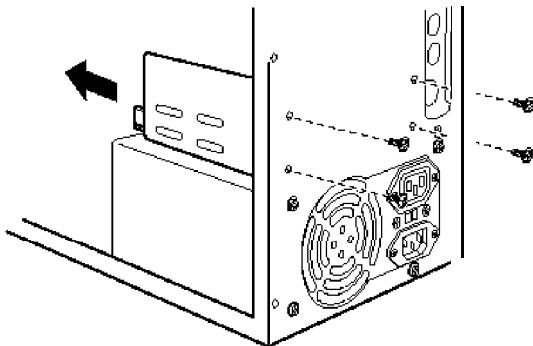
Follow these steps to remove a drive from the rear internal bracket:

1. Remove the drive and power cable from the back of each drive in the rear internal bracket.

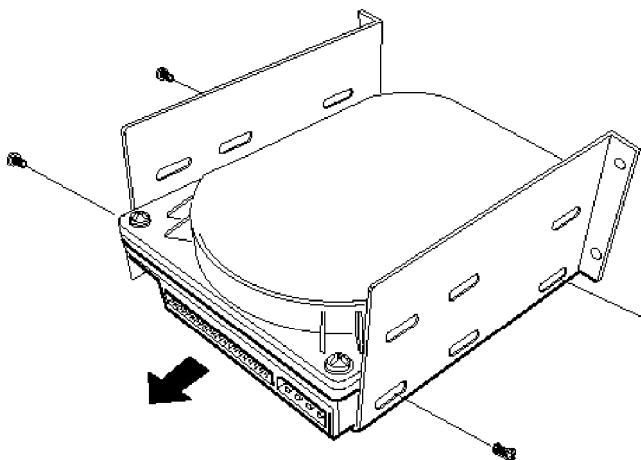


2. If you are removing the only IDE drive connected to the interface, you may want to disconnect the device cable from the interface on the main system board and remove it from the computer.

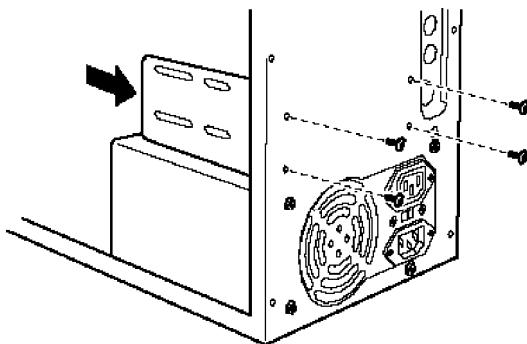
3. Remove the four screws securing the rear internal drive bracket to the computer's back panel and slide it out of the computer.



4. Remove the four screws securing the drive to the bracket and slide the drive out of the bracket.



5. Replace the bracket as shown below and secure it to the back panel with the four screws you removed earlier.



6. If there is a drive installed in the rear internal bracket, follow steps 6 through 8 under "Installing a Drive in the Rear Internal Bracket" to reconnect the drive and power cables to the drive.
7. If you have finished installing or removing drives, replace the computer's cover, as described under "Replacing the Cover" in Chapter 4. Then see "Using the Fixed Disk Setup Option" in Chapter 2 for instructions on defining your new drive configuration.

## **Troubleshooting**

If you have any problems with your computer, refer to this chapter. You can correct most problems by adjusting a cable connection, repeating a software procedure, or resetting the computer.

The troubleshooting suggestions in this chapter are organized in general categories, as listed below. Within each category, a more specific problem is described with possible solutions.

### **↗ Tip**

If you have this manual online only, you may want to print out this chapter and keep it in a safe place in case you have problems with your computer.

The following issues are included:

- Identifying your system's configuration
- Computer will not start
- Computer does not respond
- Keyboard problems
- Mouse problems
- Monitor problems
- Diskette problems
- Diskette drive problems
- Hard disk drive problems
- CD-ROM problems

- Password problems
- Software problems
- Printer or scanner problems
- Option card problems
- Memory module problems
- Controller problems
- External cache problems.

If the suggestions here do not solve the problem, contact your Authorized EPSON Servicer or the EPSON Connection for help.

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## ***Identifying Your System***

When you request technical assistance, be ready to provide the serial number and "A" code or model number of your computer, its system BIOS version number, its configuration (including the type of disk drives, monitor, and option cards), and the names and version numbers of any software programs you are using.

Use these guidelines to locate information about your system. Record the information on your *User's Digest* so you'll have it available if your system is not working.

**Serial number and  
"A" code:**

Look on the back panel of the computer to find the serial number. The "A" code label is on the side of the case.

<b>System BIOS version:</b>	Restart your system. You'll see the system BIOS version number displayed on the screen during power-on diagnostics.
<b>System configuration:</b>	Start SETUP and make a note of all your configuration option settings.
<b>Operating system version:</b>	At the MS-DOS prompt, type <b>VER</b> and press Enter. Or watch the screen when your system starts up.
<b>Software versions:</b>	In Windows applications, select <b>About</b> from the Help menu. As your software application starts, it usually displays a version number on the banner screen. Also, you can check your software manual.
<b>CONFIG.SYS:</b>	At the MS-DOS prompt, type <b>TYPE C:\CONFIG.SYS</b> and press Enter to see a listing of your CONFIG.SYS file, which contains system configuration commands.
<b>AUTOEXEC.BAT:</b>	At the MS-DOS prompt, type <b>TYPE C:\AUTOEXEC.BAT</b> and press Enter to see a listing of your AUTOEXEC.BAT file, which contains system startup commands.

## **The Computer Will Not Start**

*The power light is on, but the computer does not start.*

Place a boot or startup diskette in drive A and turn on the computer again.

### **Caution**

If you turn off the computer, always wait at least 20 seconds before turning it back on to prevent damage to its circuitry.

If your computer is set to boot from drive C, make sure that the IDE hard drive is formatted, and that the primary IDE controller is enabled by checking the setting of jumper JP25 on the system board; see “Changing the Jumper Settings” in Chapter 4.

*The computer does not start and the power light is not lit.*

Make sure the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet.

*The power cord is securely connected but the computer still does not start.*

Check the electrical outlet for power. Plug a lamp into the outlet and turn it on to see if it works.

*You installed or removed system components, and now your computer does not start.*

Check to make sure you have reconnected all the internal and external cables correctly.

You may have installed a SIMM incorrectly. If the system doesn't detect memory, it won't start. Check that your SIMMs are securely installed in the correct sockets.

If you replace the processor, make sure the new processor is installed correctly, and that the notch on the processor is aligned correctly on the system board. If you did not align it correctly, the system won't start. Also make sure the jumpers are set correctly for your processor.

For more information, see "Installing Memory Modules (SIMMs)," "Upgrading the Processor," and "Changing the Jumper Settings" in Chapter 4.

You may have installed option cards or drives that exceed the system's power limits. Check the power limits listed under "Option Slot Power Limits" in Appendix A.

## ***The Computer Does Not Respond***

*The computer locks up.*

Wait a few moments; if your computer does not respond after a reasonable length of time, press Ctrl Alt Del and follow the instructions on the screen. If that doesn't work, press the RESET button.

### ***Note***

If you press Ctrl Alt Del or RESET, you will lose any data you did not save.

You may have installed memory using SIMMs that work at the wrong speed. Install the correct SIMMs. (See "Installing Memory Modules [SIMMs]," in Chapter 4.)

Your system may have overheated. If you upgraded the processor yourself, make sure you have an adequate heat sink installed.

*You reset the computer, but it still does not respond.*

Try turning the computer off, wait 20 seconds, and turn it on again.

*Your system suddenly stops operating.*

You may have overloaded the power supply. See your option card manuals for the power requirements of your cards. Then check "Option Slot Power Limits" in Appendix A to see if they exceed the option slot power limits of your computer.

---

## **Keyboard Problems**

*The screen displays a keyboard error message when you turn on or reset the computer.*

Make sure the keyboard is securely connected to the keyboard port and not the mouse port. Although these ports look alike, they cannot be used interchangeably.

*The cursor keys on the numeric keypad do not work properly.*

If the Num Lock light in the upper right corner of the keyboard is lit, press Num Lock to turn off the function.

---

## **Mouse Problems**

*Your mouse isn't working properly.*

Make sure the mouse cable is securely connected to the mouse port and not the keyboard port. See "Connecting a Keyboard or Mouse" in Chapter 1 for instructions. Also make sure your mouse ball is clean. If you are using an MS-DOS application, make sure your mouse drivers are installed correctly.

## **Monitor Problems**

*There is no display on the screen.*

Check that the monitor's power switch is on and that its power light is on.

Also, the computer may be in a power-saving mode. When you press a mouse button or a key on the keyboard, see if the monitor displays an image.

*The power light is on, but you still do not see anything on the screen.*

Press a mouse button or a key on the keyboard to see if the monitor or computer is in a power-saving mode. Also, check the brightness and contrast controls.

If you still do not see anything on the screen, make sure the monitor is securely connected to the computer.

If you installed a display adapter card, make sure your monitor type matches the card type. Make sure you disabled the built-in VGA controller by changing the setting of jumper JP50; see "Changing the Jumper Settings" in Chapter 4 for instructions. Also be sure you set the correct display type for the **Video System** option in SETUP. (See "Using the System Setup Option" in Chapter 2.)

If you are running an application program, see if you need to set up the program for the type of monitor and display adapter you have. Also make sure you are using the appropriate monitor and display adapter for your software.

*The power switch is on but the power light is not on.*

If the monitor is Energy Star compliant, it may be in a power-saving mode. Press a mouse button or a key on the keyboard to activate the monitor.

Turn off the monitor's power, wait five seconds, and turn it back on.

If the light still does not come on, check the electrical outlet for power. Turn off your monitor and unplug it from the outlet. Then plug a lamp into the wall outlet and turn it on. If the light turns on, your monitor may be faulty.

*An illustration in one of your software applications displays incorrectly.*

For the best display performance, your system has been set to run Windows with the High Color palette (64 thousand colors). Some application programs you may install work better with the 256 color palette. If you want to change your color palette, you can use the Display utility (Windows 95) or the WinMode utility (Windows 3.1) in the Control Panel. See your Windows documentation or online help for more information about changing your Display settings.

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## **Diskette Problems**

*You see a diskette error message.*

Reinsert the diskette, making sure you insert it all the way. If the drive has a latch, turn it down to secure the diskette.

Also, check to see that you have inserted the right type of diskette in the drive. For example, make sure you are not inserting a high-density diskette in a double-density drive.

If reinserting the diskette does not solve the problem, insert the diskette in another diskette drive of the same type. If you can read the diskette in a different drive, your drive may be faulty.

*The diskette is the right type, but you still see an error.*

Check that the diskette is not write-protected, preventing the drive from writing to the diskette.

Make sure the diskette is formatted. See your operating system documentation for instructions on formatting diskettes.

The system may have the **Diskette access** security option in SETUP enabled. If you entered a User level password when you started the system, but this option is set to a Supervisor level, you see an error when you access the drive. See “Using the virus protection features” in Chapter 2 for more information.

You may have a defective diskette. Try copying the files from the bad diskette to a new diskette.

*Something is wrong with the data in the files.*

Run ScanDisk to repair the files. You may also be able to use special utilities or diagnostics to solve this problem.

---

## **Diskette Drive Problems**

*A newly installed diskette drive is not working properly.*

Make sure you have installed the drive correctly and check all the cable connections.

You see a diskette drive error when you start your computer.

Run the SETUP program and configure your system for the correct type of diskette drive. Make sure the **Floppy** controller option in SETUP is enabled. See “Configuring integrated peripherals” in Chapter 2 for more information.

The diskette drive is making loud or unusual noises.

Contact your Authorized EPSON Servicer or the EPSON Connection.

## ***Hard Disk Drive Problems***

A newly installed hard disk drive is not working properly or its performance is not what you expect.

Make sure you have installed the drive correctly and check all cable connections. Also, check the jumper settings on your drive.

If this is your only hard disk drive, make sure it is connected to the primary IDE interface on the system board. If you have a CD-ROM drive, make sure it is not connected to the same interface as the hard disk drive.

If you are using MS-DOS and Windows 3.1, make sure the PCI IDE driver is installed and loaded (see “Installing the PCI IDE Drivers” in Chapter 2). Make sure your IDE device can take advantage of the PCI IDE feature.

Some hard disk drives do not support the power management features on your system. You may need to disable these features in SETUP. See “Using the Green PC Features” in Chapter 2 for more information.

*You see a hard disk drive error when you start your system.*

Run SETUP and check that your system is auto-sensing the correct drive type. If SETUP cannot automatically detect the hard disk drive type or displays information that does not match your drive, you may need to define your own drive type. See “Defining your own drive type” in Chapter 2.

Make sure the jumpers on the system board are set correctly. Jumper JP25 enables or disables the PCI IDE hard disk drive controller. See “Changing the Jumper Settings” in Chapter 4 for more information.

Make sure the jumpers on the hard disk drive are set correctly. See the documentation that came with the drive for more information.

*You are unable to store data on the hard disk drive.*

Make sure your hard disk drive has space available for storing data.

Also, if the hard disk drive has been in a power-saving mode, make sure the drive has had time to achieve its full operating speed before you try to write data to it.

*You have been using your hard disk drive successfully for some time but notice a reduction in performance.*

The data on the disk may have become fragmented. Back up all your data and use a disk optimization utility to reorganize the files on your disk.

If you are using MS-DOS and Windows 3.1, check that your PCI IDE driver is installed and loaded. (See “Installing the PCI IDE Drivers” in Chapter 2.)

If you cannot access data on your hard disk or you are seeing read/ write errors, the disk may have a physical problem. Contact your Authorized EPSON Servicer or the EPSON Connection.

## ***CD-ROM Drive Problems***

*Your system won't read a CD- ROM drive*

Make sure the drive contains the correct CD-ROM disc. Make sure the disc is rightside up and inserted correctly in the drive.

If your system can't read the disc, make sure the drive has been installed correctly. (See Chapter 5 for a slimline computer or Chapter 6 for a tower computer.) Check that the cables are securely connected. Make sure the ribbon cable is connected so that the red wire on the ribbon cable is connected to pin 1 on the drive. Also verify that the ribbon cable is attached to the secondary PCI IDE interface and that the drivers are installed correctly. (See "Installing the PCI IDE Drivers" in Chapter 2.)

Check that the master/ slave jumpers on the drive are set correctly.

If you received documentation with your drive, check it for additional solutions.

## ***Password Problems***

*You have forgotten your pass word*

You must discharge your CMOS memory. To do this, you need to place a jumper on JP49. See "Changing the Jumper Settings" in Chapter 4 for details.

After you have changed JP49, restart your system, leave it on for a few seconds, then turn it off again. This resets the SETUP values to their factory defaults. Both the Supervisor and the User passwords are disabled.

Remove the jumper from JP49. Then turn the computer on again. If you want to set a new password, use SETUP as described under “Selecting the Security Setup Options” in Chapter 2.

## ***Software Problems***

*Your operating system won't start after you installed the PCI IDE drivers.*

If you installed PCI IDE drivers for another operating system, such as UNIX, make sure you followed the instructions in the README file for the drivers. See “Installing the PCI IDE Drivers” in Chapter 2 for instructions.

*The application program does not start*

Check that you are following the correct procedure for starting the program and that it is installed correctly. If you need help, contact your software manufacturer.

*The application program cannot read a key disk.*

You may be running an application that requires a slower processor speed. From the MS-DOS prompt, you can reduce the processor speed by pressing Ctrl Alt --. Press Ctrl Alt + to return to fast speed.

*The application program cannot read from or write to the hard disk drive.*

If you have enabled the **IDE Hard Disk Standby Timer** option in SETUP, your application may be timing out during the few seconds when the hard disk drive returns to its full speed. Disable this option in SETUP as described under “Using the Green PC Features” in Chapter 2.

*Your application has locked the computer, making it unresponsive to keyboard commands.*

Reset the computer and try again. If resetting the computer does not help, turn it off, wait 20 seconds, then turn it on again.

Some software, like OS/ 2, UNIX, or NetWare, needs at least 8MB to 16MB of RAM to work correctly. Check your software documentation for the minimum memory requirements. If necessary, add more memory as described under “Installing Memory Modules (SIMMs)” in Chapter 4.

---

## ***Printer or Scanner Problem***

*The printer or scanner does not work at all.*

Check that the printer or scanner has power and is properly connected to the computer. Also make sure your printer has paper in it. If you are using more than one serial port, check the primary and secondary port settings (COM1 and COM2) in your application program and in the SETUP program. See “Configuring integrated peripherals” in Chapter 2 for information about serial port settings in SETUP.

If you connected a scanner to the parallel port, make sure the port is set for bidirectional operation (ECP mode); see “Configuring integrated peripherals” in Chapter 2 for more information. If you use ECP mode, check your parallel device software documentation for the correct DMA channel (DRQ) setting; then set jumpers JP8 and JP18 to match the setting, if necessary. See “Changing the Jumper Settings” in Chapter 4 for more information.

*The printer prints garbled information.*

Check the printer manual for the printer’s correct DIP switch or control panel settings. Also, make sure you have the proper drivers installed for your printer and make sure you’ve selected the correct printer within your software application.

## ***Option Card Problems***

*A newly installed option card is not working correctly.*

Make sure the option card is installed correctly and is well-seated in its slot. Run SETUP to update your configuration after you install the card. If you are using Windows 95, turn on the **Reset Configuration Data** option. See “Starting the SETUP program” and “Using the Advanced System Setup Options” in Chapter 2 for instructions. Perform setup procedures for any software you are using with the card.

See the documentation that came with the option card to set any necessary DIP switches or jumpers on the card. The computer may also have some jumpers that must be set for the option card to work properly. See “Changing the Jumper Settings” in Chapter 4 for more information.

Make sure you install option cards that do not exceed the system’s power supply limits; see “Option Slot Power Limits” in Appendix A for more information.

Make sure the option card is not touching any other card or component on your main system board.

If you installed a PCI card in a PCI slot, check to see that the PCI options in SETUP are set correctly for your card. For more information, see "Configuring PCI devices" in Chapter 2.

*An external device connected to the option card is not working correctly.*

Make sure you are using the proper cable to securely connect the device to the card.

---

## ***Memory Module Problems***

*The memory count displayed by power-on diagnostics or the SETUP program is incorrect.*

You may have installed the SIMMs incorrectly. They may be the wrong type or speed, or they may not be inserted all the way or in the correct sockets. See "Installing Memory Modules (SIMMs)" in Chapter 4 for more information.

If you have installed a gold-plated SIMM in the sockets, the socket may have corroded slightly. Remove the SIMM and clean the gold-plated connector with a pencil eraser; then reinstall the SIMM.

## **Controller Problems**

You see a controller error for the drive controllers or the I/O port controllers when you start your system.

If the error message refers to your PCI IDE controller, make sure jumper JP25 is set to off; see “Changing the Jumper Settings” in Chapter 4 for more information.

If the error message refers to your diskette drive controller, make sure the controller is enabled in SETUP; see “Configuring integrated peripherals” in Chapter 2 for more information.

The indicated controller on your system board may be faulty. If you have an option card with a controller that will work with your device, you can install it and change the jumper settings on the system board to disable the built-in controller. You can then continue to use your system until it is convenient for you to have it serviced.

## **External Cache Problems**

*The amount of external cache displayed by the power-on diagnostics program is incorrect.*

You may have installed the external cache chips incorrectly. They may be the wrong type, or they may not be inserted all the way. Also, make sure the tag chip you've installed has an access speed of 15ns or 20ns.

Also, you may not have changed the SETUP program or the jumpers to recognize the new cache. Make sure you have set the External cache option to Enabled. You can access this option from the Advanced System Setup screen.

See “Changing the Jumper Settings” or “Installing External Cache” in Chapter 4 for more information about these procedures; see “Configuring cache memory” in Chapter 2 for instructions on setting the cache options in SETUP.

# *Appendix A*

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## **Specifications**

This appendix describes the following:

- Computer specifications
- Video resolutions and colors
- Processor upgrades
- Drive option information
- DMA assignments
- Hardware interrupts
- System memory map
- System I/O address map
- Connector pin assignments
- Tested operating environments
- Options available from EPSON.

## **CPU and Memory**

<i>32-bit CPU</i>	Upgradable 486-class processors
<i>Green PC energy saver</i>	Energy Star compliant, low-power doze, standby, and suspend modes for the CPU, hard disk drive, and video signals sent by the computer to the monitor; select time-out periods in SETUP; in a standard configuration of one hard disk drive and one diskette drive, system consumes less than 30 Watts in standby mode
<i>System speed</i>	Fast and slow processor speeds available; fast is the speed of the processor and slow is 8 MHz; from the MS-DOS prompt, speed selectable by pressing Ctrl Alt -- (slow) or Ctrl Alt + (fast)
<i>Memory</i>	4 or 8MB RAM standard on a SIMM; expandable to 128MB using 1, 2, 4, 8, 16, and 32MB SIMMs; SIMMs must be tin-plated, 72-pin, 32-bit, fast-page mode type with access speed of 70ns or faster
<i>ROM</i>	128KB Phoenix® system BIOS, video BIOS, and SETUP code located in Flash ROM on main system board
<i>video RAM</i>	1MB DRAM on main system board; expandable to 2MB using two 512KB, 40-pin, SOJ flat pack video DRAM chips
<i>Shadow RAM</i>	Supports shadowing of system and video BIOS ROM into RAM; shadowing selectable in SETUP program

<i>Cache</i>	8 or 16KB of internal cache in the processor; supports 128, 256, or 512KB of external cache with 32K x 8, 64K x 8, or 128K x 8, 15ns or 20ns SRAM DIP chips and a 32K x 8 tag chip
<i>Math coprocessor</i>	Math coprocessor built into the processor on all DX and Intel Pentium OverDrive processors
<i>Clock/ calendar</i>	Real-time clock, calendar, and CMOS RAM socketed on main system board with integrated Lithium battery

## **Controllers**

<i>PCI Chipset</i>	Provides PCI caching, memory and control for the PCI bus, and the two-channel PCI IDE interface; integrated PCI bridge translates CPU bus cycles to PCI bus cycles and CPU-to-PCI memory write cycles to PCI burst cycles
<i>Video</i>	Cirrus Logic® GD5430 high-performance GUI accelerator controller supports resolutions up to 1024 x 768 in 256 colors with 1MB of VRAM; 1280 x 1024 with 2MB of VRAM
<i>Diskette</i>	Controller on main system board supports up to two diskette drives or one diskette/combo diskette and one tape drive

*Hard disk* Two PCI, ATA-2 compatible two-channel, local bus IDE interfaces on main system board support up to four IDE devices (two on each channel); CD-ROM drives cannot be connected to the same channel as hard disk drives; BIOS provides hard disk auto-sensing and enhanced IDE functions

## ***Interfaces***

<i>Monitor</i>	Energy Star compliant video interface for fixed or multi-frequency monitor built into system board; 15-pin, D-shell connector
<i>Parallel</i>	One standard, multimode parallel interface built into main system board; supports S-bit unidirectional, 16-bit bidirectional, and ECP (Extended Capability Port) modes; 25-pin, D-shell connector; operation controllable by SETUP program and jumpers
<i>Serial</i>	Two high-speed RS-232C, programmable, asynchronous interfaces built into main system board; 16550-compatible; 9-pin, D-shell connectors
<i>Keyboard</i>	PS/ 2™ compatible keyboard interface built into main system board; 6-pin, mini DIN connector
<i>Mouse</i>	PS/ 2 compatible mouse interface built into main system board; 6-pin, mini DIN connector

*Option slots*      Connector card with five I/O expansion slots; three ISA compatible (8.33 MHz bus speed), two PCI compatible (33 MHz bus speed)

*Speaker*      Internal

## **Mass Storage**

### ***Slimline***

#### **Internal mount:**

One 3.5-inch wide, one-inch high drive

#### **Externally accessible mounts:**

One 3.5-inch wide, one-inch high drive  
and two 5.25-inch wide, half-height drives

### ***Tower***

#### **Front internal mount:**

One 3.5-inch wide, one-inch high drive

#### **Rear internal mounts:**

Two 3.5 -inch wide, one-inch high drives or  
one 3.5-inch wide, full-height drive

#### **Externally accessible mounts:**

Two 3.5-inch wide, one-inch high drives  
and two 5.25-inch wide, half-height drives

*Diskette drive types*      3.5-inch diskette drive, 720KB or 1.44MB storage capacity; 5.25-inch diskette drive, 360KB or 1.2MB storage capacity;  
or combination 3.5-inch/5.25-inch or 3.5-inch/PCMCIA diskette drive

*Hard disk drive types*      5.25-inch or 3.5-inch form factor hard disk drive(s), up to half-height size; maximum of four drives

<i>Other devices</i>	Half-height tape drive, CD-ROM drive, optical drive, PCMCIA card reader, or other storage device; 5.25-inch, or 3.5-inch with mounting frames
<b>Keyboard</b>	Detachable, two-position height; 101, 102, or 104 sculpted keys; country-dependent main typewriter keyboard; numeric/cursor control keypad; four-key cursor control keypad; 12 function keys
<b>Mouse</b>	Detachable, two-button, PS/ 2 compatible
<b>SETUP Program</b>	Stored in ROM; accessible by pressing Del during boot
<i>System security</i>	User and Supervisor level passwords available for system boot or diskette access
<i>Virus protection</i>	Write protection feature for the hard disk drive boot sector
<b>Power Supply</b>	
<i>Type</i>	200 Watt, UL/ TUV/ CSA listed, fan-cooled
<i>Input ranges</i>	100-120 VAC or 200-240 VAC; switch-selectable
<i>Maximum output</i>	+5 VDC at 20 Amps, -5 VDC at 0.5 Amp +12 VDC at 8 Amps, -12 VDC at 0.5 Amp
<i>Frequency</i>	50 to 60 Hz

<b>Cables</b>	Two to main system board, five to mass storage devices; for more than five devices, Y cables can be installed on the existing cables
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## **Option Slot Power Limits**

Output voltage (VDC)	+5 Volts	-5 Volts	+12 Volts	-12 Volts
For all slots	12 Amps	0.4 Amp	4.0 Amps	0.4 Amp

## **Physical Characteristics**

Dimension	Slimline	Tower
Width	16.8 inches (427 mm)	7.125 inches (181 mm)
Depth	15.8 inches (401 mm)	16.25 inches (413 mm)
Height	4.4 inches (112 mm)	13.25 inches (337 mm)
Weight	18.2 lb (8.3 kg) with one diskette drive, without keyboard	20.6 lb (9.3 kg) with one diskette drive, without keyboard

## **Environmental Requirements**

Condition	Operating range	Storage range
Temperature	41° to 90° F (5° to 32° C)	-4° to 140° F (-20° to 60° C)
Humidity (non-condensing)	20% to 90%	10% to 90%
Altitude	-330 to 9,900 ft (-100 to 3,000 m)	-330 to 39,600 ft (-100 to 12,000 m)

## **Video Resolutions and Colors**

Resolution	Memory requirements	Color	Refresh rates (Hz)	Remarks
640 x 480	1MB	256	60/72/75	8 bits/pixel
	1MB	32K/64K	60/72/75	16 bits/pixel
	1MB	16.8M (True Color)	60	24 bits/pixel
800 x 600	1MB	256	60/72/75	8 bits/pixel
	1MB	32K/64K	60/72/75	16 bits/pixel
	2MB	32K/64K	60/72/75	16 bits/pixel
1024 x 768	1MB	256	43.5/60/70/75	8 bits/pixel*
	2MB	32K	43.5/60/70/75	16 bits/pixel*
	2MB	64K	43.5	16 bits/pixel**
1280 x 1024	1MB	16	43.5	4 bit planes"
	2MB	256	43.5/60	8 bits/pixel*

\* Non-interlaced and interlaced

\*\* Interlaced

## ***Processor Upgrades***

The computer's processor can be upgraded by replacing the existing processor with a faster one. The following table lists supported processors and voltages.

### ***Supported processors***

Processor	Voltage	Processor	Voltage
AMD DX4/100	3.45	Intel DX4/100	3.45
AMD DX2/66	3.45	Intel DX4/75	3.3
AMD DX2/80	3.45	Intel DX2/50/66	5.0
Cyrix DX2/80	4.0	Intel DX, sx	5.0
Cyrix DX2/66	3.45/3.6	Intel Pentium OverDrive	5.0
Cyrix DX2/50	3.3/5.0	UMC U5S-Super	5.0
Cyrix DX4	3.45	UMC U5DS-Super	5.0

When you replace the processor, you need to check the settings of a number of jumpers. See "Changing the Jumper Settings" in Chapter 4 for a complete list.

## Information for Qualified Hard Disk Drives

The following table lists parameters for hard disk drives qualified for use in your computer.

*Hard disk drive parameters*

Parameters	Conner®						Western Digital®			
	CRS1275A	CRS850A	CRS540A	CRS425A	CRS420A	CRS270A	AC2540	AC2420	AC2340	AC2250
Formatted capacity (MB)	1275	850	540	425	420	270	540	425	341	256
Size, width × height (in)	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1
Weight (lb)	1.25	1.25	1.2	1.1	1.16	1.1	1.2	1.12	1.12	1.12
Cylinders	3687	3687	2805	839	2388	525	1048	2720	2233	2233
Disks	3	2	2	1	2	1	2	2	2	2
Heads	6	4	4	2	4	2	4	4	4	3
Sectors per track	78 - 144	78 - 144	79 - 119	78 - 144	63 - 100	72 - 117	63	55 - 99	56 - 96	56 - 96
Rotational speed (RPM)	3600	3600	3600	3600	3600	3400	4500	3314	3322	3322
Buffer size (KB)	64	64	64	64	32	32	128	128	128	64
Average seek time (ms)	<15	<15	14	14	14	14	11	<13	<13	<13
Encoding method	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7						
Power dissipation (seek)	5.6 W	5.6 W	4.3 W	3.9 W	5-12 W	3.9 W	7.0 W	5.2 W	5.2 W	5.2 W
Logical parameters										
Cylinders	2479	1652	1050	826	826	525	1048	989	1010	1010
Heads	16	16	16	16	16	16	16	15	12	9
Precomp zone	0	0	0	0	0	0	1048	989	1011	1011
Landing zone	2479	1652	1050	826	826	525	1048	989	1011	1011
Sectors	63	63	63	63	63	63	63	56	55	55

### *IDE hard disk drive jumper-settings*

Model number	Single drive	Master drive	Slave drive
Conner CFS1275A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS850A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS540A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS425A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS420A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS270A	C/D jumpered	C/D jumpered	No jumpers
Western Digital AC2540	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2420	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2340	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2250	No jumpers	5-6 jumpered	3-4 jumpered

## **DMA Assignments**

Level	Assigned device
DMA0	Reserved
DMA1	Available
DMA2	Diskette drive controller
DMA3	Available
DMA4	Cascade from DMA1 to DMA2
DMA5	Spare
DMA6	Spare
DMA7	Spare

## **Hardware Interrupts**

IRQ no.	Function
IRQ0	Timer output 0
IRQ1	Keyboard
IRQ2	Cascade to IRQ9
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Available
IRQ6	Diskette drive controller
IRQ7	Parallel port 1
IRQ8	Real-time clock
IRQ9	Available
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE controller
IRQ15	Secondary IDE controller

## **System Memory Map**

Address range	Function
FE0000h-FFFFFh	128KB duplication of ROM BIOS stored at 0E0000h-0FFFFh
100000h-FDFFFFh	System extended memory (128MB maximum)
0E0000h-0FFFFh	128KB ROM BIOS
6C8000h-0DFFFFh	Adapter ROM BIOS
0C0000h-0C7FFFh	Video ROM BIOS
6A0000h-0BFFFFh	128KB video memory
000000h-09FFFFh	640KB base memory

## System I/O Address Map

Hex address	Assigned device
000-01F	DMA controller 1, 8237
020-03F	Interrupt controller 1, 8259
022-024	Reserved
040-05F	Timer, 8254
060-06F	Keyboard controller, 8242PE
070-07F	Real-time clock NMI (non-maskable interrupt)
080-09F	DMA page register, 74LS612
0A0-0BF	Interrupt controller 2, 8259
0C0-0DF	DMA controller 2, 8237
0F0	Clear math coprocessor
0F1	Reset math coprocessor
0F8-0FF	Math coprocessor
1F0-1F8	Primary hard disk interface
1E0-1E7	Secondary hard disk interface
200-207	Game I/O
278-27F	Parallel printer port 2
2B0-2DF	Alternate enhanced graphics adapter
2E1	GPIB (adapter 0)
2E2, 2E3	Data acquisition (adapter 0)
2F8-2FF	Serial port 2
300-31F	Prototype card
360-363	Available
368-36B	Available
378-37F	Parallel printer port 1
380-38F	Available
390-393	Available
3A0-3AF	Available
3B0-3BF	Available
3C0-3CF	Available
3D0-3DF	Available
3F0-3F7	Diskette drive controller
3F8-3FF	Serial port 1

### *System I/O address map (continued)*

Hex address	Assigned device
6E2, 6E3	Available
790-793	Available
AE2, AE3	Available
B90, B93	Available
EE2, EE3	Available
1390-1393	Available
22E1	Available
2390-2393	Available
42E1	Available
63E1	Available
82E1	Available
A2E1	Available
C2E1	Available
E2E1	Available

## **Connector Pin Assignments**

*Parallel port connector pin assignments (J6)*

Pin	Signal	Pin	Signal
1	Strobe'	10	Signal ground
2	Data 0	11	Signal' _ground
3	Data 1	12	Signal ground
4	Data 2	13	Signal' _ground
5	Data 3	14	Signal ground
6	Data 4	15	Signal' _ground
7	Data 5	16	Signal ground
8	Data 6	17	Selectin *
9	Data 7	18	Signal ground

\* Active low logic

*Serial port connector pin assignments (J4 and J5)*

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Ground		

## ***Tested Operating Environments***

Although your system will run most software applications, the following operating environments have been tested for compatibility with your system.

Microsoft MS-DOS 3.3 and later  
Novell DOS®  
NovellNetWare\*3.12 and 4.1  
Novell Personal NetWare  
IBM® OS/ 2, including version 3.0 (Warp)  
SCO® UNIX  
SCO Open Desktop  
Microsoft Windows 3.1 and later  
Microsoft Windows 95  
Microsoft Windows for WorkGroups  
Microsoft Windows NT™, including version 3.5

\* Certified as workstation: tested as file server

Your system has also received Novell's "Yes, NetWare tested and approved" certification as a workstation. As new environments become available, these also will be tested.

## ***Options Available From EPSON***

Many options for enhancing and supplementing this product are available from EPSON. Call your nearest marketing location for more information about specific options.

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# **Glossary**

## *Address*

The location where information is stored in a computer's memory.

## *ATA-2*

AT Attachment. A drive interface that provides high speed and high capacity data transfer.

## *BIOS*

Basic Input/ Output System. Routines in ROM (Read Only Memory) that handle the transfer of information in your operating system.

## *Boot*

The process a computer performs to check its components and then load the operating system into memory.

## *Cache*

A high-speed memory buffer that stores frequently used data where your processor can access it faster. Your computer includes 8KB of internal cache built into the processor and may include external cache installed on the main system board. The external cache can be expanded to 512KB by installing additional cache SRAM chips.

## *CMOS*

Complimentary Metal-Oxide Semiconductor. A low-power silicon chip used for RAM and switching operations. CMOS is backed up by a battery.

## *Controller*

A processor, interface, port, or adapter that translates data between the CPU and a peripheral device, such as a hard disk, diskette drive, keyboard, or video monitor. Controllers convert data from one format to another, match speeds between devices that operate at different speeds, and isolate peripheral hardware from software.

## *CPU*

Central Processing Unit. The primary device that interprets instructions, performs tasks, keeps track of stored data, and controls input and output operations. See also *Processor*.

## *Device*

A piece of computer equipment that performs a specific task, such as a disk drive, a monitor, a printer, or a scanner. Also called a peripheral.

## *Device driver*

A file containing instructions that allow your computer to recognize and communicate with a device. The device may be a printer, monitor, or other type of device.

## *DIF*

Dual In line Package. A type of chip which has two rows of downward-pointing pins.

## *DMA*

Direct Memory Access channel. A channel for transferring data from your computer to or from peripherals without involving the CPU resources.

## *DRAM*

Dynamic Random Access Memory. A type of memory that stores large amounts of information.

## *ECP*

Extended Capabilities Port. The parallel port mode in your computer that provides bidirectional signals for the parallel port and includes other enhanced functions.

## *Expansion bus*

An internal bus that provides high-speed connections for internal peripherals that enhance the performance of your computer.

## *Extended memory*

Memory above 1MB that is accessed by 386,486, and 586 processors when they are operating in protected or virtual mode.

## *Flash ROM*

Non-volatile read/ write RAM. Flash ROM can be erased and reprogrammed using the normal voltages inside your computer. This capability allows the computer and its peripherals a means of storing data without the need for a constant supply of electricity.

## *GUI*

Graphical User Interface. A type of screen display that allows you to select items and operations by pointing to icons.

## *IDE*

Integrated Drive Electronics. A type of interface in which the controller is on the drive instead of on a controller card.

## *Interface*

A physical or software connection used to transmit data between equipment or programs so they can work with each other.

## *Interlaced*

A method of scanning a video screen which appears to double the refresh rate of the image on the screen.

## *Interrupt*

A signal that a device uses when the device is ready to accept or send information.

## *I/O base address*

The location within the input/ output space of your computer that a computer device (such as a printer or modem) uses to communicate with software.

## *IRQ*

Interrupt Request. Hardware channel over which devices can send interrupts. Typically, each device connected to the computer uses a separate IRQ.

## *ISA*

Industry Standard Architecture. The 8- or 16-bit standard developed for IBM compatible computers.

## *Jumper*

A small movable plug that connects two pins on a device's circuit board. Jumpers alter the operation of a particular function.

## *LBA*

Logical Block Address. A method of accessing large-capacity hard disk drives.

## *Local bus*

An internal bus that controls the connections from the processor to the VGA and IDE interfaces. Local bus provides increased performance and speed.

## *Math coprocessor*

A device that enables the computer to process mathematical calculations faster by using floating point numbers instead of whole numbers for calculations.

## *Memory module*

A small circuit board, commonly called a SIMM (single in line memory module), that contains surface-mounted memory chips. You can add memory modules to the main system board to expand your computer's memory.

## *Modem*

Modulator/ DEModulator. A device that allows a computer to transfer data to and from another computer by transmitting signals over telephone lines.

## *Option card*

A circuit board you can install inside the computer to provide additional capabilities, such as a modem or an additional I/O port. Option cards plug directly into option slots so you don't have to alter a computer's circuitry to enhance your system.

## *Parallel*

An interface that transmits data simultaneously over separate wires in a cable. See also *Serial*.

## *PCI*

Peripheral Component Interconnect. The standard developed by Intel Corporation for expansion design. PCI allows high-speed data transfer and was designed for the current generation of processors, but its circuitry design is not tied to the requirements of a specific processor or family.

## *PCMCIA card*

Personal Computer Memory Card International Association card. A credit-card-sized device that can be used for data storage, memory expansion, or other purposes. PCMCIA cards are often used in notebook computers.

## *Port*

A physical socket on a computer to which you can connect a peripheral device.

## *Power-on diagnostics*

Tests stored in ROM that the computer runs to check its internal circuitry, peripheral device configuration, and operating status each time you turn it on or reset it.

## *Processor*

A small CPU on one semiconductor chip. See also *CPU*.

## *RAM*

Random Access Memory. The area of the computer's memory used to run programs and store data while you work. All data in RAM is erased when you turn off or reset the computer.

## *Real-time clock*

A battery-powered clock inside the computer that tracks the time and date, even when the computer is turned off.

## *Refresh rate*

The frequency with which a monitor can redraw a screen image. The faster the refresh rate, the less the screen will flicker.

## *Reset*

To restart a computer without turning it off. You can reset your computer by pressing Ctrl Alt Del. Resetting erases all data stored in RAM and reloads the computer's operating system.

## *ROM*

Read Only Memory. Memory that can only be read and cannot be modified. ROM retains its contents even when you turn off the computer by using power from a backup battery.

## *Serial*

The type of communication that transmits data from a serial interface to a serial device over a single wire. See also *Parallel*.

## *Shadow RAM*

The system's ability to copy the contents of the system, video, and external BIOS ROMs into RAM to speed up processing.

## *SIMM*

A small circuit board, commonly called a SIMM (single in line memory module), that contains surface-mounted memory chips. You can add memory modules to the main system board to expand your computer's memory.

## *SMI*

System Management Interrupt. A signal that allows the system to regulate its power usage according to system activity levels.

## *SRAM*

Static Random Access Memory. A type of fast memory used in caches.

## *SVGA*

Super VGA (Video Graphics Array). In addition to supporting standard VGA modes, your computer's built-in SVGA controller supports resolutions up to 1280 x 1024 in 256 colors with 2MB of video memory and a compatible monitor.

## *True Color*

A VGA feature that supports 24-bits-per-pixel color, which enables your VGA interface to display 16.8 million colors. The screen image looks more like a photograph than a traditional computer image.

## VGA

Video Graphics Array. A high-resolution display adapter that provides a variety of video modes.

## *Video adapter card*

A circuit board that can be installed in one of the computer's option slots to control the way a monitor displays text and graphics.

## *Write-protect*

To protect the data on a diskette from being changed by setting the write-protect switch on a 3.5-inch diskette or by placing a write-protect tab over the notch on a 5.25-inch diskette. You cannot change data on a write-protected diskette.

## ZIF socket

Zero Insertion Force. The type of socket on your computer's system board that holds the processor. With this type of socket, it's easy to remove and install processor chips.

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# **Index**

2-slot side, 4-23-24  
3-slot side, 4-22

## A

AC inlet, 1-3, 1-5, 1-7, 7-4  
AC outlet, 1-3, 1-5, 1-7  
Advanced System Setup options, 2-7 ,7-17  
advanced chipset, 2-10  
cache memory, 2-9  
Integrated Peripherals, 2-7  
Memory cache, 2-9  
PCI devices, 2-11  
shadow memory, 2-10

Altitude requirements, A-7

Application programs  
compatibility, A-15  
problems, 7-13 -14

ATA-2 compatible, Intro-2, 2-20,  
A-4

Auto-sensing, hard disk drive, 2-5,  
A-4

AUTOEXEC.BAT file, 7-3

Autotype Fixed Disk option, 2-5

## B

Back panel, 1-3

Backup copies, 3-6, 5-13, 5-22, 6-20

Banks

cache, 4-8, 4-30  
SIMM socket, 4-8, 4-14, 4-16

Battery, 2-1, A-3

BIOS, 2-1, 7-3, A-2  
system, Intro-3  
upgrades, Intro-3  
video. Intro-3

Boot options, 2-12, 3-10, 7-4  
Boot sequence, 2-12  
Floppy check, 2-12  
Booting system, 1-9, 2-2, 2-18, 7-4  
Bracket  
drive, 4-6, -7, 5-2, 5-4 -8, 5-13, 5-15  
option slot cover, 4-23  
slot cover, 4-23  
Brightness, 7-7  
Buttons  
diskette release, 3-8-9  
power, 1-8 -10  
RESET, 1-8 -9, 3-10, 3-12, 7-1

## C

Cable

diskette drive, 5-3, 5-12 -13,  
5-19 -20, 6-12  
hard disk drive, 5-8 -11, 5-13, 5-15,  
6-6 -7, 6-19  
monitor, 1-5  
parallel device, 1-6  
power, 1-7, 4-2, 4-5  
power supply, 5-11 -12, 5-19 -20,  
6-7, 6-13, 6-19  
serial device, 1-7

Cache memory

banks, 4-8, 4-30  
configuration, 2-9, 4-29 -30  
external, Intro-2, 2-9, 4-29, 4-31,  
7-17, A-3  
installing, 4-29, 4-31  
internal, A-3  
jumpers, 4-11  
problems with, 7-17

Case

removing, 4-2-5  
replacing, 4-5

CD-ROM drive, Intro-2, 2-5, 5-1 -2, 5-21, 6-1, 6-14 -15, 7-12, A-6  
Chapter summaries, Intro-3  
CHKDSK command, 7-9  
Clock, real-time, A-3  
CMOS RAM, 2-18, A-3  
Command, stopping, 3-9  
COMn port, see Serial ports  
Component damage, 4-5, 4-13, 4-28, 4-30, 5-11, 5-20  
CONFIG.SYS file, 2-20, 7-3  
Configuration  
  changing, 2-2 -3, 2-6, 2-9, 2-13 -15, 2-18  
  files, 4-35, 7-3  
  program, see SETUP program  
Connector  
  parallel device, A-14  
  pin assignments, A-14  
  serial device, A-15  
Connector(s)  
  DB-9P, 1-7  
  diskette drive, 4-8, 5-12, 5-20  
  game port, 4-8  
  hard disk drive, 4-8, 5-6, 5-10 -11  
  keyboard, 1-3 -4, A-4  
  monitor, 1-3 -5, A-4  
  mouse, 1-3, A-4  
  option card board, 4-6, 4-8  
  parallel device, 1-6, A-4  
  printer, 1-3, 1-6, A-4  
  serial device, 1-3, 1-7, A-4  
  VGA port, 1-3 -5  
Contrast, 7-7  
Controller(s)  
  diskette drive, 4-9, A-3  
  hard disk drive, 4-9, 7-11, A-4  
  problems, 7-17  
  SVGA, 2-21, A-3  
Coprocessor, math, A-3  
Cover  
  removing, 4-24  
  replacing, 4-5  
CPU, see Pentium  
Ctrl Alt Del, 3-10, 3-12, 7-5  
Cursor, 2-3  
Customer support, Intro-4

D

DB-9P connector, 1-7  
Default settings, SETUP, 2-3, 2-18  
Depth of computer, A-7  
Diagnostics, power-on, 1-9, 7-3, 7-16  
DIP chips, see Video memory  
Disk optimization utility, 7-11  
Diskette drive  
  accessing, 2-15, 3-11, 7-9, A-6  
  bays, 1-8, 4-6, 5-2, 5-15, 5-17, 5-19 -20, 5-22 -23  
  boot sequence, 2-12, 7-4  
  cable, 5-12 -13, 5-15, 5-19, 6-12  
  configuring, 7-10  
  connectors, 4-8, 5-12, 5-20  
  controller, 4-9, A-3  
  errors, 7-8-10  
  installing, slimline computer, 5-1 -24  
  installing, tower computer, 6-1 -24  
  latch, 3-9  
  light, 1-10, 3-9  
  power supply cable, 6-13  
  problems, 7-9-10  
  removing, 5-2, 5-4, 5-22-23  
  restricting access, 2-15, 3-11, 7-9, A-6  
  types, A-5

Diskette(s)  
defective, 7-9  
drivers, 2-20-21  
errors, 7-8  
formatting, 7-9  
inserting, 3-8  
key, 7-13  
problems, 7-8  
release button, 3-8 -9  
removing, 1-10, 3-8 -9  
shutter, 3-8-9  
types, 7-8, A-5  
write-protected, 7-9

Display adapters, see Video

DMA assignments, A-11

DMA channel, 1-7

DOS command, stopping, 3-9

Double-word I/O, 7-10

Doze mode, 3-7 -8

Drive bracket, 5-2, 5-4 -8, 5-13, 5-15

Drivers  
IDE, 2-20, 7-4, 7-10 -11, 7-13  
PCI IDE, 2-18, 2-20  
printer, 7-15  
video, 2-1, 2-21  
Windows, 2-20

Drives, see Diskette drive or Hard disk drive

Dust, 1-1

E

ECP (Extended Capabilities Port), *I- /*

Electric shock, 1-8, 4-5

Electrical outlet, 1-6 -8

Electrical power source, 1-2

Electromagnetic field, 1-1

Energy Star, Intro-2, 2-16, 3-6 -7, 7-7-8, A-2, A-4

Energy, conserving, 3-6

Environmental requirements, A-7

Environments, tested operating, A-15

EPSON, contacting, Intro-4

Ergonomic tips, 3-1 -5

Errors  
controller, 7-17  
diskette drive, 7-8-10  
hard disk drive, 7-11 -12  
keyboard, 7-6  
power-on diagnostics, 1-10  
read/ write, 7-12

Expansion buses  
ISA, Intro-3  
PCI, Intro-3

External cache, see Cache memory

F

Faceplate  
removing, 5-17  
replacing, 5-23

Fast processor speed, A-2

Files  
AUTOEXEC.BAT, 7-3  
CONFIG.SYS, 2-20, 7-3, 7-11  
repairing, 7-9  
SYSTEM.INI, 2-20

Fixed Disk Setup option, 2-5 -6

Fixed Disk Setup options  
32 Bit I/O, 2-6  
Autotype Fixed Disk, 2-5  
Large Disk Access mode, 2-5  
LBA Mode Control, 2-6  
Multi-Sector Transfers, 2-6

Fixed Disk Timeout option, 2-17, 7-14

Flash memory device, Intro-3

Floppy check option, 2-12

Formatting  
diskettes, 7-9

Frames, mounting, 5-16

Function keys, SETUP, 2-3

Furniture, 3-2

## G

Game port, optional, 4-8  
Green PC, Intro-2, 2-16 -17, 3-6 -7,  
    7-7 -8, 7-14, A-2  
Grounding  
    yourself, 4-5, 4-28, 4-30, 4-32

## H

Hard disk drive  
    access light, 1-8 -9  
    ATA-2 compatibility, Intro-2, 2-20,  
        A-4  
    auto-sensing, 2-5 -6, A-4  
    bays, 1-8, 4-6, 5-2, 5-17 -18, 5-20 -21,  
        5-23, 6-4  
    boot sequence, 2-12, 7-4  
    cable, 5-8 -11, 5-13, 5-15, 6-6 -7,  
        6-19  
    configuring, 2-5-6, 5-15  
    connector, 4-8, 5-6, 5-10  
    controller, 4-9, 7-11, A-4  
    double-word I/O, 7-10  
    errors, 7-11 -12  
    IDE driver, 2-18, 2-20, 7-4, 7-11,  
        7-13  
    installing, slimline computer,  
        5-1 -24  
    installing, tower computer, 6-1 -24  
    jumpers, 4-9, 5-15, 7-10, A-11  
    master, 2-6, 5-15, A-11  
    mounting frames, 5-16  
    parameters, 2-5 -6, A-10  
    power supply cable, 6-7  
    problems, 7-10 -12  
    removing, 5-13, 5-22 -23  
    SETUP options, 2-5 -6  
    slave, 2-6, 5-15, A-11  
    standby mode, 2-16 -17, 3-7, 7-14,  
        A-2, A-4  
    suspend mode, 3-7-8  
    timeout options, 2-16-17  
    types, 2-6  
    user-defined, 2-6

Hardware interrupts, Intro-3, A-12  
Heat, 1-1  
Height of computer, A-7  
Help screen, SETUP, 2-3  
Help, EPSON, Intro-4  
Humidity requirements, 1-1, A-7

## I

I/O  
    address map, A-13 -14  
    expansion slots, see Option slots  
    problems, 7-17  
Icons, 1-3 -7  
IDE devices, Intro-1 -2, 2-1, 4-8  
Indicator lights  
    diskette drive, 1-10, 3-9  
    hard disk access, 1-8, 1-10  
    power, 1-8 -9, 7-4, 7-7  
    speed, 1-8 -9  
Industry Standard Architecture,  
    see ISA  
Inlet, power, 1-3, 1-7, 7-4  
Input ranges, power supply, 1-2,  
    A-6  
Internal cache, see Cache memory  
Internal components, 4-6, 4-8  
    damage, 4-5, 4-13, 4-28, 4-30, 5-11,  
        5-20  
    locating, 4-6 -8  
Interrupts, hardware, Intro-3, A-12  
ISA  
    expansion bus, Intro-3  
    option slots, Intro-2

## J

### Jumpers

- cache settings, 4-11, 7-17
- changing settings, 4-9, 4-12 -13
- diskette drive controller, 4-9
- game port, 1-4
- hard disk drive, 4-9, 5-15, 7-10, A-11
- hard disk drive controllers, 4-9
- location, 4-8
- port settings, 1-6, 4-9
- video settings, 4-11

## K

### K/ B port, see Keyboard

### Key disk, 7-13

### Keyboard

- connecting, 1-34
- errors, 7-6
- port, 1-3 -4, 4-8, A-4
- problems, 7-6
- specifications, A-6
- using, 3-4

### Keypad, numeric, 7-6

### Keys, SETUP function, 2-3

## L

### Lighting workspace, 3-4

### Lights, see Indicator lights

### Location, choosing, 1-1

### Lockup problems, 7-5

### Low processor speed, A-2

## M

### Main menu, SETUP, 2-2

### Marketing locations, Intro-5

### Mass storage, Intro-2, 5-2, 6-2, A-5 -6

### Master hard disk drive, 2-6, 5-15, A-11

### Math coprocessor, A-3

### Measurements, computer, A-7

### Memory

- banks, 4-8, 4-13, 4-16
- cache, see Cache memory
- clearing, 3-10
- CMOS RAM, 2-18, A-3
- configurations, 4-14 -16
- extended, A-12
- installing, 4-13, 4-16 -18
- location, 4-6, 4-8
- map, A-12
- modules, see SIMMs
- problems, 7-16
- RAM, Intro-1, 2-10, A-2
- removing, 4-19
- requirements, video, A-8
- ROM, 2-10, 2-18, A-2
- shadow, 2-10, A-2
- SIMMs, see SIMMs
- specifications, A-2 -3
- video, see Video memory

### Microprocessor, see Pentium

### Modem, 1-7

### Monitor

- cable, 1-4 -5
- connecting, 1-4 -5
- Energy Star compliant, A-2, A-4
- positioning, 3-3
- power cord, 1-5
- power requirements, 1-5
- problems, 7-7-8
- standby mode, 3-7
- suspend mode, 3-7
- SVGA, 1-4
- time-out periods, 3-7
- VGA port, 1-3, 1-5

### Mounting brackets, 4-6-7

### Mounting frames, 5-16

- Mouse**  
connecting, 1-4  
port, 1-3  
port specifications, A-4  
PSI 2 compatible, A-4  
specifications, A-6  
using, 3-4
- Multi-mode parallel port, see**  
**Parallel port or Port**
- N**
- NetWare, A-15
- Numeric coprocessor, A-3**
- Numeric keypad, 7-6**
- O**
- Operating environments, tested, A-15
- Operating system**  
diskette, 7-4  
reloading, 3-10 -11  
version number, 7-3
- Optical drive, 5-1, 6-1, A-6**
- Option cards**  
connector board, 4-6-7  
installing, 4-20, 4-23, 4-25  
power limits, 7-6, A-7  
problems, 7-15 -16  
removing, 4-27  
slimline computer, 4-22 -23  
tower computer, 4-25 -26  
VESA, A-5
- Option slots**  
full-length, 4-22  
half-length, 4-20  
ISA, Intro-2, 4-20  
PCI, Intro-2, 4-20  
PCI1 and PCI2 slots, 4-20  
power limits, 7-6, A-7  
specifications, A-5  
using, 4-20, 4-23, 4-25
- Optional equipment, A-16**
- Outlet, electrical, 1-5 -6, 1-8**
- P**
- Parallel port**  
configuring mode, 7-15  
connecting to, 1-6  
controller, A-4  
jumpers, 1-6  
location, 1-3  
pin assignments, A-14  
problems, 7-14
- Password**  
changing, 2-14  
deleting, 2-14, 3-12  
entering, 2-14  
options, 2-13 -15, 3-11  
problems, 7-9, 7-12  
prompting, 2-13  
selecting type, 2-13  
using, 3-11 -12
- PCI**  
bus architecture, Intro-1 -2  
expansion bus, Intro-3  
IDE drivers, installing, 2-20  
option slots, Intro-2, 4-20 -22
- PCMCIA card reader, A-6**
- Pentium, Intro-1**
- Peripheral Component**  
Interconnect, see PC1
- Physical characteristics, A-7**
- Plug and play technology, Intro-1, Intro-3**
- Port**  
connector pin assignments, A-14  
keyboard, 1-3  
location, 1-3  
mouse, 1-3  
multi-mode parallel, 1-3, 1-6  
serial, 1-3, 1-6 -7  
VGA, 1-3
- Ports**  
jumper settings, 4-9  
specifications, A-4
- Post-installation procedures, 4-35**
- Posture. 3-5**

**P**ower  
button, 1-8 -10  
inlet, 1-3, 1-5, 1-7, 7-4  
light, 1-8 -9, 7-4, 7-7  
source, 1-2

**P**ower cable  
computer, 1-7, 4-2, 4-5  
diskette drive, 5-12 -13, 5-20  
hard disk drive, 5-8, 5-11, 5-13,  
5-20, 5-23  
monitor, 1-5

**P**ower supply  
cable, 6-7, 6-13, 6-19  
cables, 5-11 -12, 5-19 -20  
input ranges, 1-2, A-6  
limits, 7-6, A-7  
location, 4-6  
specifications, A-6  
voltage selector switch, 1-2

**P**ower-on diagnostics, 1-9, 2-12,  
7-3, 7-16

**P**ower-saving modes, 3-7 -8

**P**recautions, iii-vi, 1-1

**P**rinter  
available options, A-16  
connecting, 1-6  
connector pin assignments, A-14  
drivers, 7-15  
port, 1-3, 1-6, A-4  
problems, 7-14  
turning off, 1-10  
turning on, 1-9

**P**rocessor, Intro-1, A-2  
locating, 4-6 -8  
upgrades, A-9  
upgrading, 4-32-34

**P**rocessor speed, changing, 3-12,  
A-2

**P**rogram, stopping, 3-9

**PSI** 2 compatible, A-4

**R**  
**R**AM, Intro-1, 2-10, A-2  
**R**andom Access Memory, see RAM  
**R**ead/ write errors, 7-12  
**R**eal-time clock, A-3  
**R**ESET button, 1-8 -9, 3-10, 3-12  
**R**esetting the computer, 3-10 -11,  
7-1

**R**esolutions, see Video resolutions  
**R**esume system activity, 3-8  
**R**OM, 2-10, 2-18, A-2  
**R**S-232C ports, see Serial ports

**S**  
**S**afety instructions, iii-vi, 1-1, 3-1 -5  
**S**canner, 7-14  
**S**CSI cards, Intro-3  
**S**ecurity and anti-virus options,  
2-13 -14, 2-16  
Diskette access, 2-15  
Fixed disk boot sector, 2-15  
Password on boot, 2-13-15  
Set User Password, 2-14  
Supervisor Password, 2-14

**S**erial number, 7-2

**S**erial ports  
connecting, 1-5 -7  
controller, A-4  
jumpers, 4-9  
location, 1-3  
pin assignments, A-15  
problems, 7-14

**S**ervice, Intro-4 -5

**S**ETUP program  
advanced options, 2-7, 2-9 -11  
anti-virus options, 2-13-15  
autotype fixed disk, 2-5  
boot options, 2-12  
cache memory, 2-9  
date, 2-4  
default settings, 2-2, 2-18  
displaying default settings, 2-3  
drive configuration, 2-4, 2-6

**SETUP program (*continued*)**

- exiting, 2-18
- extended memory, 2-4
- fixed disk setup, 2-5 -6
- floppy check option, 2-12
- function keys, 2-3
- Green PC Features, 2-16 -17, A-2
- help screen, 2-3
- keyboard, 2-4
- Main menu, 2-2
- memory shadow, 2-10
- password options, 2-13-14
- restoring default values, 2-18
- saving settings, 2-18
- security options, 2-13 -15, A-6
- starting, 2-2-3
- system memory, 2-4
- time, 2-4
- timeout options, 2-17
- user-defined hard drives, 2-6
- video, 2-4
- virus protection, 2-13 -15

Shadowing memory, 2-10, A-2

**SIMMs**

- configuration, 4-14, 4-16
- installing, 4-13, 4-16 -18
- location, 4-6, 4-8
- problems, 7-5, 7-16
- removing, 4-19
- specifications, A-2

Slave hard disk drive, 2-6, 5-15, A-11

**Slots**, see Option slots

**Slow processor speed**, A-2

**Small Computer System Interface**,  
    see SCSI cards

**Smoke**, 1-1

**Software**, see Application programs

**SOJflat pack video DRAM chips**,  
    4-27

**Speaker**, A-5

Speed light, 1-8 -9

**SRAM chips**, see Cache memory

**Standby mode**, 2-16 -17, 3-7, 7-7,  
    7-14, A-2, A-4

**Static electricity**, 4-28, 4-30

**Stopping a command or program**,  
    3-9

**Storage devices**, Intro-2, 5-2, 6-2,  
    A-5 -6

**Supervisor password**, see password

**Suspend mode**, 3-7-8

**SVGA**

- connector, 1-4
- controller, 2-21
- drivers, 2-21
- monitor, 1-4
- on-board controller, 2-4

**System**

- BIOS, Intro-3
- BIOS version, 7-3
- board components, 4-6, 4-8
- configuration, see SETUP program
- date, 2-4
- I/O address map, A-13 -14
- identifying, 7-2-3
- memory map, A-12
- resume activity, 3-8
- security, A-6
- time, 2-4
- turning off, 1-10
- turning on, 1-8

**System Setup options**, 2-3-4

- date, 2-4
- diskette drives, 2-4
- extended memory, 2-4
- keyboard, 2-4
- system memory, 2-4
- time, 2-4
- video, 2-4

**SYSTEM.INI file**, 2-20

## T

Tag SRAM, see Cache memory  
Tape drive, 5-1, 6-1, A-6  
Technical support, Intro-4  
Temperature requirements, 1-1, A-7  
Troubleshooting, 7-1-18  
Turning off computer, 1-10  
Turning on computer, 1-8

## U

Upgrading processor, 4-32-34, A-9  
Upgrading, processor, 4-33  
User password, see Password  
User-defined hard disk drive, 2-6

## V

VGA  
    monitor, 1-4 -5  
    port, 1-3, see also Video  
Video  
    BIOS, Intro-3  
    colors, A-3  
    connector, 1-3, 1-5, A-4  
    controller, A-3  
    DIP chips, see Video memory  
    drivers, 2-21  
    jumper settings, 4-11  
    port, 1-3 -5, A-4  
    problems, 7-7 -8  
    resolutions, A-3, A-8  
    SOJDRAM chips, 4-27  
    standby mode, 2-16, 3-7, 7-7, A-2  
    time-out, 2-16

## Video memory

    installing, 4-27-29  
    location, 4-6, 4-8  
    requirements, A-8  
    specifications, 4-27, A-2

Virus protection options, 2-13-15, A-6

Voltage selector switch, 1-2

## W

Weight of computer, A-7

Width of computer, A-7

Windows

    95, Intro-1  
    drivers, 2-20

Work environment, iii-iv, 3-1 -5

Work habits, 3-5

## Y

Y-adapters, 6-7, 6-13, 6-20

## Z

ZIF (Zero Insertion Force) socket, 4-32, 4-34